City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

City Commission Meeting
June 14, 2022
Agenda

Honorable Mayor, City Commissioners and Residents: This shall serve as your official notification of the Regular City Commission Meeting to be held Tuesday, June 14, 2022, at 7:30pm, in the City Commission Chambers, Pleasant Ridge City Hall, 23925 Woodward Avenue, Pleasant Ridge, MI 48069. The following items are on the Agenda for your consideration:

PUBLIC HEARING AND REGULAR CITY COMMISSION MEETING – 7:30 P.M.

1. **Meeting Called to Order.**

2. **Pledge of Allegiance.**

3. **Roll Call.**

4. **Introduction of Police Officer Patrick Lemke and Officer Pharoh Johnson.**

5. **PUBLIC DISCUSSION – items not on the Agenda.**

6. **Governmental Reports.**

7. **City Commission Liaison Reports.**
   - **Commissioner Perry – Planning/DDA.**
   - **Commissioner Schmier – Historical Commission.**
   - **Commissioner Budnik – Recreation Commission.**
   - **Commissioner Lenko – Ferndale Public Schools.**

8. **Consent Agenda.**

All items listed on the Consent Agenda are considered to be routine by the City Commission, will be enacted by one motion and approved by a roll call vote. There will be no separate discussion of these items unless a City Commissioner or visitor so requests, in which event, the item will be removed from the consent agenda and considered as the last item of business.

a. Minutes of the Regular City Commission Meeting held Tuesday, May 10, 2022.
b. Monthly Disbursement Report.
c. Resolution recognizing June as LGBTQI+ Pride Month.
d. 2021-2022 Budget Amendments.
e. Agreement between the City of Pleasant Ridge and the Michigan Fraternal Order of Police Labor Council/Pleasant Ridge Police Officers Union for years 2022-2025.
f. Appointment of James Breuckman as delegate and Timothy Schultz as alternate to Southeastern Oakland County Resource Recovery Authority (SOCRRA) Board of Trustees and the Southeastern Oakland County Water Authority (SOCWA) Board of Trustees.

9. **Fiscal year 2022-2023 Combined City Budget and the 2022 Millage Rates.**
   a. **Public Hearing** – Solicitation of public comments on the proposed fiscal year 2022-2023 Combined City Budget and the 2022 Millage Rates.
   b. Fiscal 2022-2023 Combined City Budget and the 2022 Millage Rates.

10. **Drinking Water State Revolving Fund (DWSRF) Project Plan**.
   a. **Public Hearing** – Solicitation of public comments on the proposed Drinking Water State Revolving Fund (DWSRF) project plan.
   b. Drinking Water State Revolving Fund (DWSRF) Project Plan.

11. **Woodward Streetscape/Cycle Track Project Discussion.**

12. **Agreement between the County of Oakland and the City of Pleasant Ridge for property assessing services.**

13. **City Manager's Report.**

14. **Other Business.**

15. **Adjournment.**

In the spirit of compliance with the Americans with Disabilities Act, individuals with a disability should feel free to contact the City at least seventy-two (72) hours in advance of the meeting, if requesting accommodations. If you have any ADA questions, please call the Clerk's Office (248) 541-2901.

City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

City Commission Meeting
May 10, 2022

Having been duly publicized, Mayor Scott called the meeting to order at 7:30pm

Present:	Commissioners Budnik, Lenko, Perry, Schmier, Mayor Scott.
Also Present:	City Manager Breuckman, Deputy City Clerk Emsley.
Absent:	None.

Public Discussion

Lauran Howard, 22 Oakland Park, Chairman of the Pleasant Ridge Historical Commission, along with other Historical Commission members, Nicholas Ziems, Colleen McKenna, Amber Herrick, Lisa Wetzen, Rosemary Spatafora and Jacqueline Huffman, presented a commemorative pewabic tile to Mayor Scott.

Mr. Ted Zachary, 68 Devonshire, challenged the Commission to a gardening project, who can grow the largest butternut squash and presented members of the City Commission and City Staff with butternut squash seeds.

Mr. Bobby Lawrence, Senator Marshall Bullock Chief of Staff, updated to Commission on Senator Bullocks' events and information related to the State Senator.

Accounting Services agreement between the City of Pleasant Ridge and Plante Moran, PLLC

Brian Camiller from Plante Moran gave an overview of the agreement between Plante Moran and the City of Pleasant Ridge.

22-3560

Motion by Commissioner Perry, second by Commissioner Schmier, that the accounting services agreement between the City of Pleasant Ridge and Plante Moran, PLLC be approved.

Adopted:	Yeas:	Commissioners Perry, Schmier, Budnik, Mayor Scott.
	Nays:	Commissioner Lenko.

City Commission Liaison Reports

Lenko reported on information related to the Ferndale Public Schools. Meetings are viewable on YouTube. Last meeting was April 18th. Also on YouTube is a flythrough of the Ferndale Lower Elementary School.

Perry reported on information related to the Planning Commission/DDA. Meeting held May 2nd. Welcomed two new commissioners, confirmed officer appointments, discussed the Master Plan update, Accessory Dwelling Units, the Huntington Woods Master Plan, annual budget recommendation and the Woodward streetscape project.

Schmier reported on events related to the Historical Commission. Pewabic Tile sales will begin at the end of May. Museum will be opened for an hour before City Commission meetings throughout the summer. Normal Saturday opening hours will continue. Garden Tour scheduled for 9/17, looking for volunteers to be on the tour.

Budnik reported on events related to the Recreation Department Commission Summer Camp registration, camp field trips are full but there is a waitlist. Class registrations available. Citywide garage sale this Saturday. Pool opening May 30th. Memorial Day Ceremony May 30th at 9am.

Governmental Reports

Chief Nowak update regarding police department activities. Memorial Day Ceremony May 30th. Coffee with Cop event held at the Community Center had a good turnout. Crime statistics low in Pleasant Ridge.

Consent Agenda

22-3561

Motion by Commissioner Perry, second by Commissioner Lenko, that the Consent Agenda be approved.

Adopted: Yeas: Commissioners Perry, Lenko, Budnik, Schmier, Mayor Scott.
Nays: None.

Establishing public hearing – June 14, 2022 at 7:30pm

22-3562

Motion by Commissioner Lenko, second by Commissioner Schmier, that a public hearing be established for Tuesday, June 14, 2022, at 7:30pm to solicit public comments on the proposed fiscal year 2022-2023 millage rates, and the proposed fiscal year 2022-2023 combined city budgets.

Adopted: Yeas: Commissioners Lenko, Schmier, Budnik, Perry, Mayor Scott.
Nays: None.

2022-2023 Utility Bill Rates

22-3563

Motion by Commissioner Perry, second by Commissioner Lenko, that the Resolution regarding the 2022-2023 utility bill rates be adopted.

Adopted: Yeas: Commissioners Perry, Lenko, Budnik, Schmier, Mayor Scott.
Nays: None.

Skymint Marijuana License Application

Nathan Kark, representing the applicant and Peter Grace working as a consultant for the applicant and the property owner, gave a brief presentation regarding the business plan and location. They both answered questions from the City Commission.

22-3564

Motion by Commissioner Perry, second by Commissioner Schmier, that the Skymint marijuana license application postponed until a future meeting date, to provide the applicant time to provide supplemental information in response to the concerns raised by the City Commission this evening.

Adopted: Yeas: Commissioners Perry, Schmier, Budnik, Lenko, Mayor Scott.
Nays: None.

City Manager's Report

South Oakland County Water Authority (SOCWA) emergency water main was scheduled for repair. Homeowners had some interruption in service while they were looking at making the repairs.

Staff will be meeting with the Woodward Heights traffic consultant.

Woodward streetscape project ongoing, construction should begin in July/August and be completed this year.

Other Business

Commissioner Perry kicking off the Name the Streetsweeper contest. There will be information forthcoming on the contest and how to vote. Questions regarding the Consumers Energy line replacement project. Breuckman stated the Consumers Energy schedule is dictated by the utility. There are two projects throughout the City, a mainline replacement and individual line replacements. They have been responsive to customer issues, questions and complaints. Perry wanted to thank Brian Camiller from Plante Moran for their consistency and professionalism throughout the term of the accounting services agreement.

Commissioner Schmier announced the "Conversation with Commissioners" event will be held Thursday, May 12th, 7:00pm, at Gainsboro Park.

With no further business or discussion, Mayor Scott adjourned the meeting at 9:37pm.

_____
Mayor Bret Scott

_____
Amy M. Allison, City Clerk

May 2022

ACCOUNTS PAYABLE

PAYROLL LIABILITIES	$	11,527.04
ACCOUNTS PAYABLE	$	242,244.27
TAX LIABILITIES	$	180,455.85
TOTAL	$	434,227.16

PAYROLL

May 4, 2022	$	42,568.41
May 18, 2022	$	38,506.91
TOTAL	$	81,075.32

CHECK REGISTER FOR CITY OF PLEASANT RIDGE

PAYROLL LIABILITIES

May 2022

Check Date	Check	Vendor Name	Description	Amount
5/4/2022	6410500399	ALERUS FINANCIAL	RETIREMENT CONTRIBUTIONS	$ 2,499.43
5/4/2022	6410500400	ALERUS FINANCIAL	HCSP CONTRIBUTIONS	$ 794.83
5/4/2022	6410500401	FOPLC	UNION DUES	$ 144.00
5/4/2022	6410500402	ALERUS FINANCIAL	RETIREMENT CONTRIBUTIONS	$ 660.30
5/4/2022	6410500403	ALERUS FINANCIAL	RETIREMENT CONTRIBUTIONS	$ 1,907.03
5/18/2022	6410500404	ALERUS FINANCIAL	RETIREMENT CONTRIBUTIONS	$ 2,061.00
5/18/2022	6410500405	ALERUS FINANCIAL	RETIREMENT CONTRIBUTIONS	$ 660.30
5/18/2022	6410500406	ALERUS FINANCIAL	HCSP CONTRIBUTIONS	$ 637.48
5/18/2022	6410500407	ALERUS FINANCIAL	RETIREMENT CONTRIBUTIONS	$ 2,162.67
			TOTAL PAYROLL LIABILITIES	$ 11,527.04

CHECK REGISTER FOR CITY OF PLEASANT RIDGE
TAX LIABILITIES
May 2022

Check Date	Check	Vendor Name	Description	Amount
05/05/2022	2889	CITY OF PLEASANT RIDGE-DDA	2022 TAX COLLECTIONS	2,410.26
05/05/2022	2890	CITY OF PLEASANT RIDGE-GENERAL	2022 TAX COLLECTIONS	396.56
05/05/2022	2891	FERNDALE SCHOOL DISTRICT	2022 TAX COLLECTIONS	34,988.72
05/05/2022	2892	JENNIFER MONDAY	2022 TAX OVERPAYMENT	165.77
05/05/2022	2893	VOID CHECK	VOID CHECK	0.00
05/05/2022	2894	CITY OF PLEASANT RIDGE-TAXES	2021 FINAL TAX COLLECTIONS	72,676.72
05/05/2022	2895	OAKLAND COUNTY TREASURER	2021 FINAL TAX COLLECTIONS	69,817.82
			TOTAL TAX LIABILITIES	180,455.85

CHECK REGISTER FOR CITY OF PLEASANT RIDGE
ACCOUNTS PAYABLE
May 5, 2022

Check Date	Check	Vendor Name	Description	Amount
05/05/2022	25325	A&F WATER HEATER AND	HWH REPLACEMENT - FITNESS CENTER	$ 1,608.79
05/05/2022	25326	ACCUSHRED, LLC	SHREDDING SERVICES	$ 58.00
05/05/2022	25327	ADKISON, NEED & ALLEN P.L.L.C.	ATTORNEY SERVICES	$ 297.25
05/05/2022	25328	ALL PRO EXERCISE, INC.	FITNESS CENTER EQUIPMENT REPAIRS	$ 159.00
05/05/2022	25329	ALPHA PSYCOLOGICAL SERVICES LLC	PRE EMPLOYMENT SERVICES-JOHNSON	$ 725.00
05/05/2022	25330	ANDERSON, ECKSTEIN & WESTRICK	ENGINEERING SERVICES	$ 21,734.18
05/05/2022	25331	AQUATIC SOURCE	POOL MIANTENANCE	$ 7,095.56
05/05/2022	25332	ASCENSION MI EMPLOYER SOLUTIONS	PRE EMPLOYMENT SERVICES-LEMKE	$ 98.00
05/05/2022	25333	BADGER METER, INC.	MONTHLY METER SERVICES	$ 1,136.53
05/05/2022	25334	BEST CHOICE HOME SERVICES	BUILDING MAINTENANCE SERVICES	$ 1,959.00
05/05/2022	25335	BLOOMFIELD SPORTS SHOP	SPORTS UNIFORM SUPPLIES	$ 539.00
05/05/2022	25336	CITY OF FERNDALE	INSPECTION SERVICES-APRIL 2022	$ 2,175.00
05/05/2022	25337	CIVICPLUS	ONLINE CODE SERVICES	$ 350.00
05/05/2022	25338	CREATIVE AWARDS	SPORTS AWARD SUPPLIES	$ 994.90
05/05/2022	25339	DAVEY TREE EXPERT COMPANY	TREE MAINTENANCE AGREEMENT	$ 3,300.00
05/05/2022	25340	EUGENE LUMBERG	ATTORNEY SERVICES	$ 472.50
05/05/2022	25341	GREAT AMERICA FINANCIAL SRV	TELEPHONE LEASE SERVICES	$ 433.00
05/05/2022	25342	HYDROCORP	CROSS CONNECTION PROGRAM	$ 125.00
05/05/2022	25343	JULIE BRAZEN	RECREATION PROGRAM INSTRUCTOR	$ 230.40
05/05/2022	25344	KATIE MCGOWAN	RECREATION PROGRAM INSTRUCTOR	$ 336.00
05/05/2022	25345	LAURAN HOWARD	HISTORICAL MUSEUM REPAIR REIMBURSEMENT	$ 10.07
05/05/2022	25346	MICHAEL CHRISTY	RECREATION PROGRAM INSTRUCTOR	$ 603.20
05/05/2022	25347	NORTHWEST SUBURBAN SWIM LEAGUE	2022 DUES AND RIBBONS	$ 794.00
05/05/2022	25348	NYE UNIFORM	UNIFORM SUPPLIES-NAGY	$ 264.50
05/05/2022	25349	O'REILY AUTO PARTS	VEHICLE MAINTENANCE	$ 10.49
05/05/2022	25350	OAKLAND COUNTY TREASURER	SHORT TERM BOND FEES	$ 4.07
05/05/2022	25351	OAKLAND SCHOOLS	PRINTING AND MAILING UTILITY BILLS	$ 660.76
05/05/2022	25352	PLANTE & MORAN PLLC	ACCOUNTING SERVICES	$ 11,676.00
05/05/2022	25353	SCHEER'S ACE HARDWARE	DPW MAINTENANCE SUPPLIES	$ 56.51
05/05/2022	25354	SEMCOG	2022 MEMBERSHIP DUES	$ 807.00
05/05/2022	25355	SOCRRA	REFUSE COLLECTION AGREEMENT	$ 9,927.00
05/05/2022	25356	SOCWA	WATER PURCHASES	$ 11,383.72
05/05/2022	25357	SPRAY - PATCH	ROAD MAINTENANCE SUPPLIES	$ 6,870.00
05/05/2022	25358	UNIFIRST CORPORATION	MAT RENTAL AND JANITORIAL SUPPLIES	$ 220.88
05/05/2022	25359	VETTRAINO CONSULTING	CAC FACILITATION SERVICES	$ 283.40
05/05/2022	25360	WETMORE TIRE AND AUTO	VEHICLE MAINTENANCE AND REPAIR	$ 518.56
05/05/2022	25361	WEX BANK	FUEL PURCHASES	$ 2,131.45
05/05/2022	25362	XFER COMMUNICATIONS	PD FIREWALL RECONFIGURATION ONSITE	$ 552.50
			TOTAL ACCOUNTS PAYABLE	$ 90,601.22

CHECK REGISTER FOR CITY OF PLEASANT RIDGE
ACCOUNTS PAYABLE
May 24, 2022

Check Date	Check	Vendor Name	Description	Amount
05/24/2022	25363	ALL PRO EXERCISE, INC.	MAINTENANCE AND REPAIR FITNESS EQUIPMENT	$ 159.00
05/24/2022	25364	AQUATIC SOURCE	POOL MAINTENANCE AND REPAIRS	$ 580.60
05/24/2022	25365	ASCENSION MI EMPLOYER SOLUTIONS	PRE EMPLOYMENT SERVICES-JOHNSON	$ 176.00
05/24/2022	25366	BLUE CROSS BLUE SHIELD OF MICHIGAN	HEALTHCARE BENEFITS-RETIREES	$ 3,144.78
05/24/2022	25367	BRILAR	DPW SERVICES-MARCH 2022	$ 5,580.31
05/24/2022	25368	CITY OF FERNDALE	FIRE PROTECTION AGREEMENT	$ 21,381.72
05/24/2022	25369	CITY OF OAK PARK	SOCMA DINNER COST SHARE	$ 464.76
05/24/2022	25370	DAVEY TREE EXPERT COMPANY	TREE MAINTENANCE SERVICES	$ 452.00
05/24/2022	25371	DETROIT EDISON COMPANY	STREETLIGHTING-APRIL 2022	$ 3,832.23
05/24/2022	25372	EXLTERRA	GEPS SYSTEM INSTALLATION DEPOSIT	$ 8,192.00
05/24/2022	25373	G2 CONSULTING GROUP	ENGINEERING AND INSPECTION SERVICES-CONC	$ 1,278.00
05/24/2022	25374	GREAT LAKES WATER AUTHORITY	IWC CHARGES-APRIL 2022	$ 272.58
05/24/2022	25375	HUNTINGTON NATIONAL BANK	ANNUAL BOND ADMINISTRATIVE FEE	$ 500.00
05/24/2022	25376	J & J AUTO TRUCK CENTER	PATROL CAR MAINTENANCE	$ 59.43
05/24/2022	25377	LEGAL SHIELD	PREPAID LEGAL SERVCES BENEFIT	$ 77.70
05/24/2022	25378	MICH.MUNICIPAL WORKER'S COMP.	WORKERS COMPENSATION PREMIUM INSTALLMEN	$ 4,319.00
05/24/2022	25379	MICHIGAN MUNICIPAL LEAGUE	ANNUAL MEMBERSHIP DUES	$ 2,207.00
05/24/2022	25380	NYE UNIFORM	UNIFORM PURCHASES-NOWAK	$ 576.70
05/24/2022	25381	OAKLAND COUNTY TREASURER	SEWERAGE TREATMENT - APRIL 2022	$ 50,902.58
05/24/2022	25382	OAKLAND SCHOOLS	UTILITY BILL PRINTING AND MAILING	$ 4,658.27
05/24/2022	25383	PROGRESSIVE IRRIGATION	PARK MAINTENANCE AND REPAIRS	$ 140.00
05/24/2022	25384	ROCKET ENTERPRISE, INC	ANNUAL FLAG MAINTENANCE AGREEMENT	$ 815.00
05/24/2022	25385	SHERMAN NURSERY FARMS	TREE PURCHASES AND PLANTINGS	$ 18,056.51
05/24/2022	25386	SOCRRA	REFUSE COLLECTION AGREEMENT	$ 9,258.76
05/24/2022	25387	TOSHIBA FINANCIAL SERVICES	COPIER LEASE AGREEMENT	$ 982.92
05/24/2022	25388	UNIFIRST CORPORATION	MAT RENTAL AND JANITORIAL SUPPLIES	$ 228.56
05/24/2022	25389	UNUM LIFE INSURANCE COMPANY	LIFE INSURANCE BENEFITS	$ 607.25
05/24/2022	25390	VINCE RIZZO	RECREATION PROGRAM SUPPLIES	$ 180.00
05/24/2022	25391	XFER COMMUNICATIONS	ONSITE NETWORK MAINTENANCE AND SUPPORT	$ 1,718.58
			TOTAL ACCOUNTS PAYABLE	$ 140,802.24

CHECK REGISTER FOR CITY OF PLEASANT RIDGE
ELECTRONIC PAYMENTS
May 2022

Check Date	Check	Vendor Name	Description	Amount
05/09/2022	3197	BLUE CROSS BLUE SHIELD OF MICHIGAN	HOSPITALIZATION BENEFITS	10,840.81
			TOTAL ACCOUNTS PAYABLE	$ 10,840.81

City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

PROCLAMATION
Declaring June 2022 as LGBTQI+ Pride Month in the City of Pleasant Ridge

Whereas, the City of Pleasant Ridge is a city rich in diversity and this diversity is demonstrated in the people who live, work and socialize in our city; and

Whereas, the Pleasant Ridge City Commission values this diversity and appreciates and celebrates the rich variation of persons in our city; and

Whereas, this city is proud of its heritage that accepts and welcomes diverse people, and we believe in a society that treats people on the basis of their intrinsic value as human beings without prejudice and unfair discrimination based on age, gender, race, color, religion, marital status, national origin, sexual orientation or physical challenges; and

Whereas, the City of Pleasant Ridge understands and appreciates the cultural, civic, and economic contributions of the Lesbian, Gay, Bisexual, Transgender, Queer and Intersex communities to the greater community of Pleasant Ridge; and

Whereas, the City of Pleasant Ridge recognizes June as the month celebrated worldwide yearly with pride by GLBTQI+ communities and that June 2022 is the 53nd anniversary of the beginning of the modern Lesbian Gay rights movement which began in June 1969 in the great City of New York.

NOW, THEREFORE, I, Bret Scott, on behalf of the entire City Commission, recognize and declare June 2022 as LGBTQI+ Pride Month in the City of Pleasant Ridge and we pledge to continue our efforts at creating and maintaining a city which is free and open that provides equal opportunity, fair treatment and human dignity for all people.

_____

Bret Scott, Mayor

SIGNED AND SEALED THIS 14th DAY OF JUNE 2022

City of Pleasant Ridge

From: Kelly Howey, Plante Moran
To: Pleasant Ridge City Commission
Date: June 8, 2022
Re: 2021-22 Budget Amendment #2

Overview

The following budget amendments reflect actual year-to-date activity.

Background

Budget Amendment Group 1 – General Fund

General Fund activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Revenues		
101-000-478.000	Building Permits	$37,000
101-000-651.000	Use & Admission Fees	$10,000
101-000-653.000	Registration Program Fees	$71,000
101-000-667.000	4 Ridge Rental	$6,750
Expenditures		
101-101-955.000	Miscellaneous Expenses	($10,000)
101-101-958.000	Membership and Dues	$1,000
101-248-931.000	Building Maintenance	$10,000
101-750-730.000	Special Program Supplies	$5,000
101-750-809.000	Contractual Services	($8,000)
101-966-999.218	Transfers Out - Infrastructure	$300,000

Budget Amendment Group 2 – Major Street Fund

Major Street Fund activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Expenditures		
202-478-810.000	Public Works Contract	$8,100

Budget Amendment Group 3 – Local Street Fund
Local Street Fund activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Expenditures		
203-463-810.000	Public Works Contract	$23,500
203-478-810.000	Public Works Contract	$22,100

Budget Amendment Group 4 – Infrastructure Improvements
Infrastructure Improvements activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Revenues		
218-000-699.101	Transfers In – General Fund	$300,000

Budget Amendment Group 5 – Pool/Fitness Facility
Pool/Fitness Facility activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Revenues		
251-000-636.300	Swim Team Fees	$16,500
Expenditures		
251-759-929.500	Pool Maintenance	$22,500

Budget Amendment Group 6 – Library Fund
Library Fund activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Expenditures		
271-299-800.000	Library Services Contract	$1,092

Budget Amendment Group 7 – SCAF – Parks Special Revenue Fund
SCAF – Parks Special Revenue Fund activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Revenue		
258-000-665.100	Investment Gains and Losses	($301,100)

Budget Amendment Group 8 – Historical Fund
Historical Fund activity is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Expenditures		
297-803-731.000	Operating Supplies	$350
297-803-931.000	Building Maintenance	$900

Budget Amendment Group 9 – Water and Sewer Fund

Water and Sewer Fund is being amended to more accurately reflect actual year-to-date activity.

		Increase (Decrease)
Expenditures		
592-536-810.000	Public Works Contract	$85,000
592-536-970.000	Capital Outlay	$37,500
592-536-970.594	Capital Outlay – Sewer Projects	$17,500

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: June 8, 2022

Re: Police Union Contract Agreement

Overview

Attached is a proposed contract between the City of Pleasant Ridge and the Police Officers' Union. The current contract expires on June 30, 2022. The proposed contract would run from July 1, 2022 through June 30, 2025.

Administration and the police officers' union negotiated the terms of the contract amicably. The police officers' union and the City Commission must now both approve the contract.

Background

There are no major changes in this contract compared to the terms of the expiring contract. The City and the Union have negotiated changes in health care and pension benefits as part of the expiring contract. Those changes helped to address increasing costs associated with health care and the City's underfunded pension system, and no changes to those terms have been made in the currently proposed contract.

The changes in the currently proposed contract are focused primarily on salary and procedural items related to how the department functions. A summary of notable changes follows:

- Wages have been adjusted based on benchmarks from nearby communities. The proposed patrol officer salary places Pleasant Ridge slightly above the average salary from a survey of 63 other departments across the southeast Michigan region (PR: $74,628, average: $72,367).

- Wages will increase equal to the inflation rate multiplier used to determine how much City property taxes can increase in years 2 and 3 of the contract. This provides certainty that wage increases will match the City's property tax revenue increases.

- The City will provide a stipend for new ballistic vests for officers every 5 years. This was done by policy in the past and is now being added to the contract. The amount of reimbursement has been increased as well.

- The probationary pay scale has been compressed from 5 to 4 years, and the amount of pay at each step has been increased. This is intended to improve employee attraction and retention as competition for qualified officers has increased.

The remainder of the changes are process clarifications and do not have a monetary impact on the City's budget.

Requested Action

City Commission approval of the proposed agreement with the Pleasant Ridge Police Officers. The agreement will become effective July 1, 2022 provided that it is approved by both the City Commission and the PRPD patrol officer's union.

AGREEMENT

between

The City of Pleasant Ridge

and the

Michigan Fraternal Order of Police Labor Council

Representing

the

Pleasant Ridge Police Officers

July 1, 2022 through June 30, 2025

June 7, 2022 Draft

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AGREEMENT

This Agreement entered into this first day of July, 2022, between the City of Pleasant Ridge, a municipality in Oakland County, State of Michigan, hereinafter referred to as the "City" and the Michigan Fraternal Order of Police Labor Council, hereinafter referred to as the "Union."

ARTICLE 1. PURPOSE AND INTENT

1. The general purpose of this agreement is to set forth terms with respect to rates of pay, hours of employment, fringe benefits and other conditions of employment, and to promote orderly and peaceful relations between the City and the Union for the mutual interest of the City of Pleasant Ridge, its employees and the Pleasant Ridge Police Officers Association, its members, and the residents of the City of Pleasant Ridge.

2. The parties recognize the essential public services involved and that the interests of the community and the job security of-the employees depend upon the success of the City and the Union in establishing proper service to the residents of the City.

3. The parties mutually recognize that the responsibility of both the employees and the City to the public requires that any dispute arising between the employees and the management be adjusted and settled in an orderly manner, without interruption of said service to the public.

4. To these ends the City and the Union encourage, to the fullest degree, friendly and cooperative relations between the respective representatives of all levels and among all employees.

NOW, THEREFORE, FOR AND IN CONSIDERATION OF THE PREMISES AND THE MUTUAL PROMISES AND AGREEMENTS HEREINAFTER CONTAINED, IT IS AGREED THAT:

ARTICLE 2. RECOGNITION OF THE UNION

1. The City recognizes the Michigan Fraternal Order of Police Labor Council as the sole and exclusive bargaining agent to the extent permitted and required by Act 333, Public Acts of 1947 as amended by Act 379, Public Acts of 1965, for all uniformed police officers of the City of Pleasant Ridge below the rank of Sergeant who are sometimes hereinafter referred to as employees.

2. It shall be a condition of continued employment after thirty (30) days of service that all employees covered by this Agreement shall either maintain membership in the Michigan Fraternal Order of Police Labor Council ["FOPLC"] by paying the union dues, initiation fees and assessments, if any, or, a collective bargaining fee at least ninety percent (90%) equivalent to the union dues, initiation fees and assessments, if any, for the cost of negotiating and administering this Agreement.

   Any employee who has failed to either maintain membership or pay their required collective bargaining service fee for a period of forty-five (45) days shall not be retained by the City; provided, however, no employee shall be terminated under this provision unless:

a. The FOPLC has notified the employee by a letter addressed to his or her last known address, with a copy to the City, indicating he or she has been delinquent for forty-five (45) days in payment, specifying the current amount of delinquency and warning the employee that unless the amount is tendered within ten (10) calendar days of the date of the letter, he or she will be reported to the City for termination from employment; and

b. The FOPLC shall furnish the City with written proof that the foregoing procedure has been followed and shall supply the City with a copy of the notice to the employee. The FOPLC shall further provide the City, after ten (10) days' notice, with written demand that the employee discharged in accordance with this provision and provide the City an affidavit signed by the Director of the Fraternal Order of Police or his/her designee certifying that the amount of delinquency does not exceed the union dues, initiation fees and assessments, if any, or collective bargaining service fee for the cost of administering and negotiating this Agreement.

All sums deducted from an employee's pay as provided for in this Agreement shall be forwarded by the City to the Michigan Fraternal Order of Police Labor Council at 1457 East 12 Mile Road, Madison Heights, Michigan 48071 and shall be made payable to the Fraternal Order of Police Labor Council. In the event a refund is due any employee for any sums deducted from wages earned and paid to the FOPLC, it shall be the responsibility of the affected employee to obtain the appropriate refund from the Michigan Fraternal Order of Police Labor Council.

The Michigan Fraternal Order of Police Labor Council shall indemnify the City against any and all claims, demands, suits or other forms of liability which may arise out of or by reason of action taken or not taken by the City for the purposes of complying with the provisions of this Article.

3. The City agrees to negotiate with the Union on matters relating to rates of pay, hours and conditions of employment, fringe benefits and other matters contained in this Agreement.

4. Employees and Union representatives all have the right to join the Union; to engage in lawful concerted activities for the purpose of collective negotiations or bargaining as to rates of pay, wages, hours of employment, fringe benefits or other conditions of employment or other mutual aid and protection; to express or communicate any view, grievance, complaint or opinion related to the conditions or compensation of public employment or their betterment, free from any and all restraint, interference, coercion, discrimination or reprisal.

5. The Union agrees to save and hold harmless the City from damage or other financial loss which the City may be required to pay or suffer because of enforcing the provisions of this Article.

6. The parties agree that the City may institute a part-time officer program. The part time officers will receive an hourly salary (no greater than the hourly salary set forth in the contract) as determined by the City. The City may credit prior law enforcement service and advance the employee on the salary schedule at the discretion of the City. The Department may not utilize part-time officers for more than an aggregate total of one hundred (100) hours per week. The hour maximum will not apply if all full-time officers decline an overtime assignment and the part- time officer works the hours.

ARTICLE 3. RECOGNITION OF MANAGEMENT'S RESPONSIBILITY

1. It is recognized that the management of the City, the control of its properties and the maintenance of order and efficiency, are solely the responsibilities of the City. Other rights and responsibilities belonging solely to the City are hereby recognized, prominent among which, but by no means wholly inclusive, are:

   The right to decide the number and location of its facilities, station, etc.; work to be performed within the unit; maintenance and repair; amount of labor and supervision necessary; machinery and tool equipment; methods; schedules of work, together with the selection, procurement, designing, engineering and the control of equipment and materials; and the right to purchase services of others, by contract or otherwise, except as they may be otherwise specifically limited in this Agreement.

2. It is further recognized that the responsibility of the Management of the City for the selection and direction of the working forces, including the right to hire, suspend, or discharge for just cause, assign, promote or transfer, to determine the amount of overtime to be worked, to relieve employees from duty because of lack of work or for other legitimate reasons, is vested exclusively in the City, subject only to the seniority rules, grievance procedure and other express provisions of this Agreement as herein set forth. Both parties agree that any changes to the current scheduling system of the Police Department shall be discussed with and agreed upon prior to implementation unless the Police Department has been mobilized.

3. The City may, in its discretion, modify the duties of officers under this agreement to include the duties of a public safety officer. The City may further, in its discretion consolidate or merge services with other municipalities. Should the city choose to undertake a public safety officer program, the rates of compensation to be paid to officers under this agreement for the performance of public safety duties shall be subject to collective bargaining.

ARTICLE 4. REPRESENTATION AND BARGAINING

1. The Union shall be represented in all negotiations by the Michigan Fraternal Order of Police Labor Council and by a committee of not more than two (2) representatives elected by the membership. Any changes in the bargaining committee shall result in written notification to the other party.

2. The Union may be represented by legal counsel at any time.

3. On duty officers who are members of the committee shall be permitted to negotiate a working agreement and process grievances without loss of pay or benefits. However, the City shall endeavor to schedule negotiations when bargaining members are off duty. Grievance processing will not unreasonably interfere with police duties and responsibilities.

ARTICLE 5. JOINT RESPONSIBILITY

1. There shall be no strikes, concerted failure to report to work, picketing, slowdowns, or stoppages of work, during the term of this Agreement or during any period while negotiations are in progress between the parties hereto, for the amendment or renewal of this Agreement.

2. The City will not lock out an employee during the term of this Agreement or during any period while negotiations are in progress between the parties hereto for the amendment or renewal of this Agreement.

ARTICLE 6. SENIORITY

1. Probationary Period for New Hires

   a. A new employee shall be a probationary employee until he has served for a period of one year from his date of employment. This probation is designed to acquaint the new employee with his work responsibility and management with the employee's work ability and attitude in the position. An employee may be terminated at any time during this probationary period.

   b. The probationary period may be extended for a period of up to one additional year for good cause at the discretion of the Chief of Police. At any time during this additional year, the employee may be discharged or recommended for placement as a permanent employee upon the written recommended by the Chief to the officer, Association and management. At the end of the probationary period the employee shall be entered on the seniority list as of the first day of his employment, or he shall be discharged from the department for failing to qualify.

   c. Probationary employees shall have a performance review discussion with the Chief of Police every three (3) months during the probationary period. A copy of the evaluation checklist report shall be given to the probationary employee after the discussion.

2. The "Department" for purpose of seniority shall be the Police Department.

3. Seniority shall terminate if the employee:

   a. Resigns, quits or retires.

   b. Is discharged for just cause and is not reinstated.

   c. Is absent for three (3) consecutive work days without notifying the City, unless as a result of justifiable cause.

   d. Files a false reason to obtain a leave of absence or fails to return to work within three (3) days after termination of any leave of absence without a bona-fide excuse acceptable to the City.

   e. Separates from the City following settlement covering total disability.

4. The Selective Service Act as presently existing or subsequently amended shall govern the re-employment right of servicemen.

5. Seniority shall in all cases accumulate while an employee is on an approved leave and for any approved extension thereof.

6. The City shall keep a seniority list of all Police Department employees. Each January 15th and July 15th an updated seniority list shall be provided by the City to members of the Pleasant Ridge Police Officers Association.

7. Employees shall notify the City of their proper post office address or change of address, and the City shall be entitled to rely upon this address for all purposes.

8. The selection of work shifts, vacations and holiday weeks will be by departmental seniority. The Chief of Police shall allow all patrol officers to select assignments by seniority. The shifts shall be set by the City. These shifts shall be set for a specific length of time, to be considered a shift period.

ARTICLE 7. LAYOFFS

When there is an indefinite reduction of employees in the Police Department, the following procedure shall govern in making layoffs. Nothing herein shall prevent the Association and the City from negotiating the work schedule to curtail layoffs.

1. All part-time employees shall be laid-off first. Part-time officers shall not be hired or brought back to work until all laid off, full time police officers have returned to work; or laid off full time police officers have severed employment with the City.

2. If additional layoffs are necessary, lowest seniority employees shall be laid off first.

3. Upon layoff of any employee, he shall be entitled to all his accrued sick leave, holidays, vacation leave and personal business days.

4. Recalls from layoff shall be by order of highest seniority, provided the employee is able to perform the work required.

5. Employees on the seniority list, when recalled to work, shall be given two calendar weeks' notice in which to report for work. Recalls shall be made by certified mail, return receipt requested. Copies of notices shall be given to the Association.

6. If any employee fails to report within two calendar weeks after being notified, or fails to file a satisfactory explanation acceptable to the City for not reporting, he will be considered as having voluntarily resigned.

7. The City may recall the next employee in order of seniority pending the reporting of the seniority employee recalled.

8. When employees are recalled to work or are laid off, the Association shall be given the names and order of recall or layoff.

ARTICLE 8. PROMOTIONS

1. Promotions of employees covered by this agreement to the rank of Sergeant shall be on a competitive basis. The process will consist of a written and oral exam. The oral exam shall be a board review conducted by three command officers from other departments not familiar with department members.

2. Eligibility for promotion shall be limited to employees who have completed five (5) years as a full time sworn police officer with at least three (3) of those five years in Pleasant Ridge, as of the date of the written exam.

3. A promotion list will be established based on evaluation criteria including written, oral, and/or assessment style testing. The weighting and type of evaluations to be used will be determined by the City prior to the start of the promotion process.. Candidates who receive a combined score of less than 70% will be disqualified. If no candidate achieves a 70% score the City may choose to re-test, or to choose to not disqualify the candidates and use the scores.

4. When making a promotion, the City may select from the top two candidates on the promotion list. If, at the end of the process, the merits, abilities, and qualifications of the employees being considered are deemed to be equal, seniority shall prevail.

5. The promotion list will expire 24 months from the date of publication, or at any time when there are fewer than two (2) candidates on the list.

6. The employee who is promoted will be granted a one (1) year probationary period to prove his/her ability. During the probationary period, the employee will have the opportunity to voluntarily revert to their former classification/rank and former rate of pay without loss of seniority. If it is determined by the City in its sole discretion at any time during the probationary period that the employee cannot perform the duties of their new position, they will be returned to their prior position without the loss of seniority, and neither the employee nor the Union shall have recourse to the grievance procedure over such return.

ARTICLE 9. SICK LEAVE

1. Sick leave is defined to mean the absence from duty of an employee because of his illness, incapacity or exposure to contagious disease.

2. Sick Leave Credits: Employees shall earn eight (8) hours of sick leave with pay for each calendar month of service completed, for an accrual of 96 hours per year

3. Sick Leave Use: Sick leave credits may be used at any time during the year when authorized pursuant to this Agreement.

4. Days Off, Holidays and Vacation Leave: Computation of sick leave days used shall not include regular days off, vacation leave or holidays.

5. Proof of Illness or Injury: The City may require a certificate from a doctor or other evidence that the illness or injury is bona fide prior to allowance of sick leave compensation. Medical certification shall not be required until after the third day of illness or injury.

6. Reporting Illness: Any employee who becomes ill and/ or unable to report for work at the established time set by the Chief or his designee for his shift to begin must, unless circumstances beyond his control prevent such reporting, notify the officer on duty at least two hours prior to the starting time of his shift on the first day of his absence and each day thereafter if not hospitalized, or sick leave pay will not be granted. Failure to do so may result in disciplinary action, subject to the grievance procedure.

7. Illness Not Qualifying for Use of Sick Leave Credits: No employee shall be paid for sick leave while absent from duty because of the following causes:

    a. Disability arising from any injury purposely self-inflicted.

    b. Sickness or disability sustained while on leave of absence.

8. An employee with accumulated sick leave credits may use such if he is absent during his scheduled work hours because of:

    a. His bona fide personal illness or injury.

    b. The serious illness or injury of a member of his immediate family, namely: spouse, child, father, mother, sister, brother, father-in-law, mother-in-law, stepfather, stepmother, or guardian.

    c. A maximum 80 hours of sick time may be used for the birth of a child.

9. Employee's Presence Required: Sick leave credits may be used in surgical cases or critical illness of the members of the immediate family when the employee's presence is required by the attending physician to a maximum of seven 7 days, and the physician so certifies.

10. Sick Leave Credit Bank: Sick leave earned and not used may be accumulated in the employee's sick leave bank from year to year, to a total of four hundred eighty (480) hours. For all full-time employees hired after July 1, 2018, the maximum accumulation shall be three hundred sixty (360) hours.

11. Vacation, Holiday Use for Sick Leave: If the employee so elects, after all accrued sick leave credits have been used, vacation leave, holiday leave, personal business days and emergency leave days may be used and payment made therefore, to the extent of vacation leave and personal business days accrued, to which the employee is entitled.

12. Action Following Payment for All Leaves: When the employee is not working and receives his last check for sickness or disability, he will be placed on leave without pay for a period equal to his seniority at the time of layoff or one (1) year, whichever ends first. If at the end of that time, the employee is still unable to return to work, his employment shall be terminated. The employee shall be eligible for re-employment, provided he has completely recovered and has a doctor's certificate to that effect, subject to City physical examination and approval.

13. Protecting the Sick Leave Plan: The Union agrees to share the responsibility in protecting the Sick Leave Plan from abuses by employees, recognizing that the plan is intended to provide pay coverage under situations of actual need as outlined in the foregoing paragraphs.

14. Transfer of Sick Leave Credits: Each employee may transfer up to a maximum of eighty (80) sick hours credit from his sick leave bank when such employee is on leave due to non-duty illness, injury or disability after the employee has used his personal business days, vacation days and holidays. An employee may elect to use his/her accumulated overtime prior to or after. transferring sick leave credits from another employee.

15. Record of Sick Leave Bank: Each July 1, the Chief of Police will provide to each member of the bargaining unit a list showing accumulated time in each employee's sick leave bank. If an employee believes that an error has been made, he shall notify the Chief of Police by no later than August 1. If the employee believes the list to be correct, he shall, as well, notify the Chief of Police by no later than August 1. The final list will be given to all bargaining unit members by no later than August 20th.

16. Retirement: On his day of retirement from the City, each employee shall receive compensation equal to his then daily rate of pay multiplied by the number of hours remaining in his sick hours bank, not to exceed 480 hours for officers hired before July 1, 2018, and not to exceed 240 hours for officers hired after July 1, 2018.

17. Voluntary Separation and Separation because of Death: On his day of voluntary separation from city employment, having completed eight (8) years of service, an employee shall receive compensation equal to his then daily rate of pay multiplied by the number of days remaining in his sick hour bank not to exceed four hundred eighty (480) hours. In the event of termination of employment because of death, the decedent employee's spouse and/or other beneficiary shall receive a benefit equal to such employee's then daily rate of pay multiplied by the number of hours remaining in his sick bank, not to exceed four hundred eighty (480) hours.

18. Discharge: In the event of the employee's discharge for-just cause, all accumulated or unused sick hour credits shall be canceled and not paid.

19. Workmen's Compensation Supplement: Any employee sustaining either disability or injury received in the discharge of his or her duties as an employee of the City, shall receive for one hundred and eighty (180) days period from the City, an amount to supplement income received under the Workmen's Compensation Act of Michigan, sufficient to maintain his or her income from both sources at an amount equal to his or her regular salary or wages. This one hundred and eighty-day (180) day period shall not be deducted from the employee's sick leave bank.

20. When an employee begins a fiscal year at his/her maximum accumulation in the sick leave back, or reaches their maximum accumulation during a fiscal year, the employee shall continue to accrue 8 hours of sick time per month during the year. At the end of the fiscal year, any unused sick time in excess of their maximum allowed accumulation will be forfeited.

    If the employee ends a fiscal year with more than their maximum allowed accumulation in the sick bank, and used 48 or fewer sick hours during the course of the preceding fiscal year, the employee shall be paid for 50% of the forfeited sick time at straight time on the first pay period in July.

    example 1: an employee has 480 hours in their sick bank on July 1, 2018. The employee accrues an additional 96 hours of sick time during the year, but uses 36 hours, leaving them with 540 hours in their sick bank on June 30, 2019. The 60 hours of excess sick time are eliminated and the sick bank resets to 480 hours on July 1, 2019, and the employee is paid for 30 hours (50% of the eliminated 60 hours) at straight time at the preceding fiscal years' pay rate with the first pay period in July.

    example 2: an employee has 480 hours in their sick bank on July 1, 2018. The employee accrues an additional 96 hours of sick time during the year, but uses 60 hours, leaving them with 516 hours in their sick bank on June 30, 2019. The 36 hours of excess sick time are eliminated and the sick bank resets to 480 hours on July 1, 2019, but the employee is not paid for any of the eliminated sick time because they used more than 48 hours during the preceding fiscal year.

example 3: an employee has 460 hours in their sick bank on July 1, 2018. The employee accrues an additional 96 hours of sick time during the year, but uses 36 hours, leaving them with 520 hours in their sick bank on June 30, 2019. The 40 hours of excess sick time are eliminated and the sick bank resets to 480 hours on July 1, 2019, and the employee is paid for 20 hours (50% of the eliminated 60 hours) at straight time at the preceding fiscal years' pay rate with the first pay period in July.

ARTICLE 10. BEREAVEMENT LEAVE

1. An employee shall be allowed up to three (3) working days, five (5) days if out of state, as bereavement leave days, for each death in the immediate family. Bereavement leave days taken in excess of three working days will be deducted from employee's sick leave bank.

2. Immediate family is defined as follows: spouse, child, mother, father, brother, sister, stepmother, stepfather, grandmother, grandfather, guardian and spouse's immediate family.

3. Proof of Death: The City may require a certificate from a doctor or other evidence of death.

4. To be eligible for pay the employee must notify the Chief of Police or his designee of the leave.

ARTICLE 11. VACATION LEAVE

1. Vacation leave is authorized absence from duty with pay.

2. Vacation Earned: As of July 1, eligible employees shall receive:

   40 hours at the beginning of year 2
   80 hours at the beginning of year 3
   120 hours at the beginning of year 6
   160 hours at the beginning of year 11
   176 hours at the beginning of year 16

3. Vacation picks shall be picked in "draft style" by all employees below the rank of Sergeant in the police department by departmental seniority in one-week increments.

   After all employees have chosen one week of vacation, the second round starts with the highest seniority person for a second pick for a week vacation.

   Should an employee choose to pass any of their selections in any of the rounds, the employee that passed his selection may not bump an employee that has already chosen a specific week from the "draft" pick.

   Once the vacation draft picks have been completed they shall be turned over to the Police Chief or his designee for scheduling and record keeping purposes.

   Individual vacation days are not included in this draft style of picks. One-week vacation leave will take priority over individual vacation leave days.

No more than forty-four (44) hours of vacation time shall be scheduled in any given week.

The vacation picks process shall commence by no later than May 15th of each year.

4. Employees shall accrue vacation time during their first year of service. This vacation time will not be used until the following fiscal year. At the start of the following fiscal year, each employee shall be credited with vacation time prorated based on the actual time worked during the previous year.

5. Earned Vacation: Employees shall receive credit for a month's work for every month in which they work at least 80 hours, excluding vacation time and time coming.

6. Vacation Deferred: Vacation leave cannot be accumulated or deferred from one fiscal year to another.

7. Vacation Pay Allowed: Employees shall be allowed vacation pay in any of the following instances:

    a. Any employee who is denied permission to take his vacation leave shall at their discretion be paid for such canceled vacation on the next scheduled pay day.

    b. Any employee who gives twenty-one (21) calendar days' notice regarding termination of his employment with the City shall be entitled to his regular pay, compensatory time and for any unused portion of his vacation time, as of date of separation.

    c. Any employee who is placed on indefinite layoff may be paid, at his option, his accrued and unused vacation time at the time of such layoff.

    d. In the event of an employee's death, all vacation leave earned will be paid, at the then rate of pay, to his widow and/or other beneficiary.

8. Vacation Pay Not Allowed: Employees shall not be entitled to accrued vacation pay if any of the following apply:

    a. If an employee separates himself from the City because of absence without leave.

    b. If an employee fails to give at least twenty-one (21) calendar days' notice in advance of termination date.

    c. If a probationary employee leaves the employee of the City before completing his probationary period.

    d. If an employee is discharged for just cause.

9. Vacations will not be changed or canceled except by mutual agreement by the employee and the City. If vacation time is canceled due to a serious situation that cannot be anticipated by either party, the employee will be paid double time (2x) his rate of pay. Canceled vacation time will not be deducted from the vacation time bank.

ARTICLE 12. HOLIDAYS

1. An employee with one year of service prior to July 1 shall be granted a holiday leave of 112 hours for the following fourteen (14) paid holidays: Independence Day, Labor Day, Veterans Day, Thanksgiving Day, day after Thanksgiving, Christmas Eve, Christmas Day, New Year's Eve, New Year's Day, Presidents Day, Good Friday, Easter, Memorial Day, and the officer's Birthday.

   An officer with less than one (1) full year of service prior to July 1 will be granted a holiday leave equal to the number of holidays that fell during the period of employment.

2. Holiday Leave Defined: Holiday Leave is leave granted, with pay.

3. Holiday Leave Granted: The City grants fourteen (14) paid holidays, identified above.112 hours for paid holidays shall be placed in a holiday bank on July 1 of each year. On or before that date, the employee may request to have the entire 112 hours be paid or placed in the Holiday Bank or he may request a minimum of one-half of the 112 hours (56 hours) to be placed in the Holiday Bank and the remaining 56 hours paid on his next regular paycheck.

   Banked holidays must be used within that fiscal year (July 1 to June 30). Holidays may be used separately or in conjunction with vacation leave, both subject to the approval of the Chief of Police. Holiday leave will be selected by departmental seniority.

   Employees that work a holiday will receive compensation at the rate of time and one-half for a maximum of eight hours.

4. Holiday Pay Allowed: Holiday pay will be paid when:

   a. Departmental work load prevents taking time off.

   b. Employee gives twenty-one (21) calendar days' notice prior to separation from the City.

   c. If an employee is placed on indefinite layoff.

   d. In the event of an employee's death, all leave earned w be paid at the then rate of pay to the employee's spouse and/or other beneficiary.

5. Holiday Pay Not Allowed: Employees shall not be entitled to accrued holiday pay if any of the following apply:

   a. If an employee separates himself from the City because of absence without leave.

   b. If an employee fails to give at least twenty-one (21) calendar days' notice in advance of termination date.

   c. If a probationary employee leaves the City before completing his probationary period.

   d. If the employee is discharged for just cause.

6. The Association allows the City to utilize the relief shift personnel and/or part-time employees to cover requested personal business days in attempt to minimize overtime.

7. If holiday week leaves are canceled due to work load, employee will be notified in writing seven (7) days prior to the holiday time.

8. All payments under this article shall be in the next payroll period.

ARTICLE 13. PERSONAL TIME

1. Personal Business Time Granted: Personal business time is leave with pay to permit the employee to dispose of any personal business. This time may be used in conjunction with holiday time or vacation time. Employees are granted 32 hours of personal business time per year. Employees will be guaranteed personal business time by providing at least fifteen (15) day advance notice in writing. The Association agrees that one officer may use personal business time per any given day. Personal business time may not be used for the fourteen (14) designated holidays, unless an agreeable arrangement can be reached with whoever must work to cover that shift.

2. Physical fitness standards will be determined by the City and the union. Officers meeting said standards will receive 12 hours of extra personal business time, provided that the use of the personal business time cannot create overtime without prior approval of the Police Chief or his/her designee. Participation in such standards is strictly voluntary and there will be no discipline issued as a result of this section.

3. Personal Emergency Leave Time Granted: Each employee is granted two (2) emergency leave days (non-cumulative) a year, with time off charged to the employee's sick bank.

ARTICLE 14. UNIFORM ALLOWANCE

The City grants to each employee:

1. The uniform allowance for patrol officers will be $750.00. Uniforms shall be kept in excellent condition according to the standards of the City. This amount shall be paid annually to the officer with his/her first paycheck in July. The Police Chief may compel an officer to replace worn or disheveled uniforms or equipment at the officer's cost.

2. The uniform maintenance and cleaning allowance for patrol officers will be $600.00 to be paid annually in one check with his/her first paycheck in December.

3. When any new employee is hired he/she will be provided with two pairs of pants, two short sleeve and two long sleeve shirts, and a $300 allowance for other uniform and kit items on a reimbursement basis.

4. Uniforms damaged beyond repair in the line of duty will be replaced by the City with no charge to the employee's allowance.

5. Any employee who is terminated is required to return his uniform(s) and any other City equipment in reasonable condition prior to receiving his final paycheck.

6. If an employee resigns during his first year of employment the employee will be required to reimburse the City the full cost of any uniforms/equipment purchased by him with the uniform

allowance. The employee is also required to return any City identification cards, shoulder patches and badges which identify them as a Pleasant Ridge Police Department employee.

7. Starting September 1, 2022 and every five years thereafter, the City will provide up to $1,000 towards the purchase of new ballistic vests for all officers. The employee may choose to purchase a more expensive vest with the employee contributing the excess cost over $1,000. The City agrees to pursue all available grant funding to offset the cost of vests.

ARTICLE 15. TRAINING and EDUCATION

1. Training. The City promotes policies, programs, and training for officers to maintain a professional department and to enable officers to better serve the community.

2. Overnight accommodation shall be provided by the City for any multi-day training program that is located more than 75 miles from the City, or for any one-day training program that is located more than 100 miles from the City. The City shall also provide a $20 per diem for meals for any training that qualifies for overnight lodging.

3. The City shall provide a $10 per diem for meals for any off-site training located within Oakland, Macomb, or Wayne Counties where lunch is not provided as part of the training program.

4. Tuition Reimbursement. After three years of seniority, the City will reimburse an employee up to $1,000 per calendar year toward the cost of higher education at a State of Michigan accredited college or university for classes related to the field of police work (e.g. law enforcement, criminal justice, etc.) with prior approval by the City Manager. Reimbursement may include cost of tuition and/or books required for the course. To qualify for reimbursement, the employee must show official proof of at least a 3.0 GPA.

ARTICLE 16. LIFE INSURANCE, LIABILITY INSURANCE, and DISABILITY INSURANCE

1. The City will provide the full premium for group term life insurance, Double Indemnity, in the amount of fifty thousand dollars ($50,000.00).

2. The City will provide basic liability insurance coverage in the amount of $10,000,000 in accordance with its existing public liability insurance policy.

3. The City will provide short and long-term disability insurance for all officers. The policy will have the following minimum level of benefits:

    a. Short Term Disability Benefits: 50% of base pay with $500 weekly maximum following a 15-day waiting period, with a 24-week maximum benefit duration.

    b. Long Term Disability Benefits: 60% of base pay up to a maximum monthly benefit of $4,000 following a 180-day waiting period. The ending age for coverage shall be 65, and the term disability shall be as defined in the City's selected policy.

ARTICLE 17. HOSPITALIZATION - MEDICAL COVERAGE

1. Active Employees.

   a. The City will provide full-time active employees with medical and prescription drug benefits consistent with the Platinum metal tier as defined under the Affordable Care Act. The health care plan shall be a Blue Cross Blue Shield of Michigan plan. The Platinum level of benefits may be achieved through a combination of medical insurance and cash contributions to a Health Savings Account. The combination of medical insurance and Health Savings Account contributions will be determined prior to the beginning of each calendar year to remain compliant with the Affordable Care Act. New employees shall become eligible to participate in the hospitalization plan on the first day of the month after ninety (90) days of employment with the City. In the first ninety (90) days of employment a new employee may purchase coverage through the City at their own expense.

   b. The City shall provide for dental coverage, Community Dental Plan 2 w/DO- FACR, with a maximum $1,000.00 per member, through agreement with Blue Cross-Blue Shield of Michigan.

2. Retiree Health Care (employees hired before July 1, 2017).

   a. The City shall provide health insurance, optical insurance and dental insurance the same as effective upon retirement date for employee/retiree and spouse who retire under MERS with a minimum of 25 years of service and age 50. For purposes of this section, "spouse," means that person to whom the employee is married, if any, on the date of retirement. The foregoing insurance shall not be provided if the retiree is eligible for health insurance equal to or better than what is offered by the current employer of the retiree. If in disagreement between the City and Retiree of "equal to or better than", an independent insurance consultant agreed upon by both parties will decide equal to or better than. All fees for consultant to be covered evenly between the City and Retiree. Upon reaching Medicare eligibility, the retiree shall be responsible for enrolling in and receiving coverage under Medicare Part A and B. The health, dental and optical insurance shall be the same as then provided to active employees.

   b. The City shall provide Michigan Blue Cross-Blue Shield Blue Vision (24/24/24) Optical Program, providing for coverage for employees and family examination once each two years, and glasses provided to those needing corrective lenses.

   c. The City shall provide Michigan Blue Cross-Blue Shield Optical Program for employee/retiree and spouse who retire under Municipal Employees Retirement System.

3. Retiree Health Care (employees hired after July 1, 2017). Employees shall be provided a retiree health savings plan in lieu of employer-provided retiree health insurance. The Employer will contribute 3% of base wage on behalf of each employee for each month in which the employee is compensated at least 120 hours. The employee will also contribute 1% of base wage into the RHSP, pro-rated monthly, through payroll deduction. Employee accounts will be invested in a qualified plan under the provisions of the Internal Revenue Service. Employees who retire or otherwise terminate employment with the City will be entitled to apply their contribution and their vested City contribution for qualified medical expenses including the cost of health insurance in accordance with IRS regulations. Employees will be vested in the City contributions under the plan

according to the following schedule: two years of seniority: 25%, four years of seniority: 50%, six years of seniority: 100%.

4. Health Insurance Buy-Out. Any employee who voluntarily elects not to obtain medical/optical/dental coverage shall be entitled to a three thousand ($3,000.00) yearly cash payment if coverage is not provided for the entire year. Payments shall be made by separate check on the first paycheck in December and the first paycheck in July of each year to cover each preceding six (6) month period. An employee may re-enroll during the enrollment period established by the carrier. If this occurs payments will be prorated accordingly.

5. Employees will be allowed to fund the co-pay from the sick leave bank if it is necessary to use a non-network physician, hospital or drug store.

ARTICLE 18. RATES OF PAY

1. Police officers covered by this agreement shall receive the following base rate of pay:

   Fiscal Year beginning July 1, 2022: $74,628.15 ($35.88 hourly)
   Fiscal Year beginning July 1, 2023: Cost of living increase
   Fiscal Year beginning July 1, 2024: Cost of living increase

   For the purposes of this section, the cost-of-living increase shall be the most recent available inflation rate multiplier used in the capped value formula published by the State of Michigan Department of Treasury. The City shall provide the inflation rate multiplier bulletin published by the State of Michigan to the Union and the membership as soon as it is available, which is usually in the December preceding the beginning of the next fiscal year.

2. Officers certified as Emergency Medical Responders (formerly known as Medical First Responder training) as of July 1, 2022 shall be compensated with a $0.50 hourly wage increase beyond the above listed wages. The City shall be responsible for the cost of training and certification of the Officer as an Emergency Medical Responder.

3. Probationary Pay: Probationary pay is defined as the rate of pay for a new employee during the first four (4) years of employment with the City. The City may, at its discretion, start a new officer at any of the probationary pay steps based on the employee's prior experience. Probationary Pay shall be as follows:

   a. Start to 1st year 80%

   b. At start of 2nd year 87.5%

   c. At start of 3rd year 95%

   d. At start of 4th year 100%

4. All employees will be paid by electronic funds transfer every two (2) weeks on Wednesday.

ARTICLE 19. RETIREMENT

1. Employees Hired Before July 1, 2017:

   a. The City shall provide a system of retirement benefits under Plan B-4 (2.50% F.A.C.) effective July l, 1998 pursuant to the Michigan Municipal Employees Retirement Act, being Public Act 135 of 1945, as amended for employees hired prior to July 1, 2011.

   b. The City agrees to elect to waive the provisions of Section 47 of the above Act, relating to the reduction of benefits in the case of retirement prior to age 60, provided, however, that the election shall provide that such waiver shall be limited to employees who have 25 or more years of credited service.

   c. The City shall provide a vesting period upon completion of eight (8) years of service.

   d. Employees shall contribute 2.5% of payroll to MERS.

2. Employees Hired After July 1, 2017. The City shall provide a MERS Hybrid Plan with the following retirement benefits:

   a. The Defined Benefit ("DB") component shall consist of the following provisions:

      (i) Benefit Multiplier of 1.0%.

      (ii) Final Average Compensation (FAC) shall be based on the highest consecutive 3 years.

      (iii) Compensation for the DB portion of the Plan is defined as base wages.

      (iv) Vesting shall be 6 years.

      (v) Early normal retirement with unreduced benefits at age 55 with 25 years of service.

      (vi) The DB component shall be exclusively funded by the City, with no member contributions permitted.

   b. The Defined Contribution ("DC") component shall consist of the following provisions:

      (i) Vesting:
      25% after 2 years of service
      50% after 4 years of service
      100% after 6 years of service

      In the event of disability or death a participant's (or his/her beneficiary's) entire employer contribution account shall be 100% vested, to the extent that the balance of such account has not previously been forfeited.

      (ii) Early normal retirement at age 55 with 25 years of service.

      (iii) The City contribution shall be the difference between the percentage of payroll contributed by the City to fund the DB Component of this Plan as determined annually by the Plan's actuaries (both normal and UAL costs) and 9.0%. There shall be no

minimum City contribution to the DC Component of this plan should the cost to fund the DB Component meet or exceed 9.0% of payroll.

(iv) The mandatory Employee contribution to the DC Component of the Plan shall be 5.0% of payroll. Voluntary employee contributions may be made after-tax, subject to the Section 415(c) limitations of the Internal Revenue Code.

3. The notice requirements for the employee's eligibility for any pay or fringe benefit payment shall be revised to provide twenty-one (21) calendar days' notice of resignation.

ARTICLE 20. HOURS OF WORK AND SHIFTS

1. Shifts: A shift is defined to be eight (8), ten (10), or twelve (12) consecutive hours of service performed by an employee, unless modified by the Chief due to circumstances of emergencies. Overtime shall not be paid for these shifts until an employee exceeds the eight (8), ten (10), or twelve (12) hours of work scheduled for that shift. Overtime shall be paid for any hours of service performed by an employee in excess of eighty (80) hours per two-week pay period. The City shall establish the shifts, the working hours for each, and the employee assigned to each shift. The city shall not schedule more than 44 hours of work on consecutive days, without providing two (2) consecutive days off (excluding special event scheduling, training, or overtime).

2. Schedules shall be selected annually by seniority. Opportunity for shift selection shall be initiated on May 15 of each year. The first shift period shall start on the first Sunday in July, and the last shift period shall end the Saturday prior to the first Sunday in July. Actual shift starting times and days off for each shift shall be selected by the City.

3. The City shall not schedule split days off unless agreed upon between the City and the Police Officer.

4. Officers shall be allowed to trade shifts with prior approval by the Chief of Police. Such approval shall not be unreasonably withheld. Trading shifts shall not cause the payment of overtime.

5. Unless authorized by the Chief of Police, no more than sixteen (16) hours paid leave shall be authorized per day and no more than eighty (80) hours paid leave in each calendar week shall be authorized by the Department for Police Officers. This provision shall apply to the use of personal business days in conformance with the contract, or those situations in which additional hours over and above eighty (80) hours would not cause the payment of overtime.

6. The schedule of work will be posted in the Department at least two weeks before the workweek. The schedule will be signed and dated by the Chief of Police or the Command Officer. A workweek begins Sunday at 12:01 AM. and ends Saturday at 12:00 A.M

ARTICLE 21. ATTENDANCE

1. Employees are expected to be regular in their attendance and to observe the working hours established by the Chief.

2. Habitual tardiness and absenteeism may be cause for disciplinary action, up to and including discharge.

3. Arrangements for time off must be made with the Police Chief or his designee in advance, and in accordance with the provisions of leave regulations under which the time off is to be taken.

4. .A continuing record of each employee's vacation leave, sick leave and all other absences shall be kept by the Chief on the employee's personnel record and shall show all leaves earned and used and all other absences.

5. A new employee will not be allowed to take earned time off for the first sixty (60) days of employment other than scheduled time off and emergency sick time, as approved by the Chief of Police. All Holidays worked during the first sixty (60) days will be considered to have been earned on the sixty-first (61st) day of employment. All earned time off will be paid on a prorated basis and may be taken in the following year of employment.

   For example, an employee is hired on January 1, 2019 and works through June 30, 2019, or 50% of the year 2019. On July l, 2019, that employee has earned and will receive 50% of the total time off entitled to a one (1) year employee (i.e. vacation, holidays and personal business days). Those earned days may be taken during the fiscal year of July 1, 2019 through June 30, 2020.

ARTICLE 22. ARMED SERVICES

Employees who are members of the National Guard or other such units of the Armed Forces are permitted to take leaves of absence without pay during the annual training period of their units. This leave shall not exceed two (2) weeks during each fiscal year unless required by proper government authority.

ARTICLE 23. LEAVE WITHOUT PAY

1. Seniority employees may be granted leaves of absence without pay for periods up to thirty (30) days for reasons acceptable to the City. All requests for leaves without pay shall be in writing. Extensions may be granted, in writing, where proper justification is shown. Seniority shall accumulate during approved leaves.

2. Employees granted a leave of absence shall not accrue vacation or sick leave or any other leave credits or other leave days during the leave of absence.

3. The employee shall be reinstated in his former position upon expiration of his leave and his return to duty on time, Should the employee fail to report for duty within three (3) days after expiration of the leave of absence, such failure may be cause for dismissal.

ARTICLE 24. JURY DUTY

When an employee is required to serve on a jury, he will be excused from his regular duties on the days he is required to and does appear in court. On days when his attendance in court is not necessary, the employee will be required to work all scheduled hours on his shift. The city will pay the employee his regular rate of pay while he is on jury duty. Any jury pay or fee must be turned over to the City Treasurer.

ARTICLE 25. SUSPENSION OF LEAVES

1. Leaves provided for in this agreement may be temporarily suspended during any period of emergency declared by the City.

2. It is agreed that leave time will be suspended beginning the afternoon shift of the Thursday before the Annual Woodward Dream Cruise event through the day shift the Sunday following the event.

ARTICLE 26. OVERTIME

1. Compensatory time will be awarded on a time-and-one-half basis for any time worked beyond the regularly scheduled forty (40) hours (or 44 hours if on a 12-hour schedule). Each employee may accumulate up to a maximum of one hundred and twenty (120) hours of compensatory time. The use of compensatory time is subject to prior Department approval and shall not cause overtime. Each July, in the first pay period, employees may choose to be paid for any portion, or all, of their accumulated compensatory time.

2. Field Training Officers will accrue one hour of compensatory time for each six hours workedwith a probationary employee, up to a maximum of 6 weeks in any fiscal year. If a FTO works with probationary employee(s) for more than 6 weeks a year, compensatory time will not be awarded after the 6th week of shifts.

3. Court time shall be fixed at a minimum of three (3) hours overtime for all municipal court appearances, other City Courts, Probate Courts, and Circuit Court appearances. Court overtime shall be at the indicated time-and-one-half basis. For paid Court appearances the employee shall receive his regular days' pay, but must turn over to the City the fees received for his appearance in Court.

4. Overtime shall be credited after the first fifteen (15) minutes past the end of the duty shift, or fifteen (15) minutes before the shift, and shall be adjusted to the closest half-hour period. Overtime shall also apply when an off-duty officer is called in and reports in response to such call.

5. In-service training time, including range training, outside of the normal shift schedule shall be credited as overtime. Employees shall receive a minimum two- hour call-in for training classes canceled after the employee's arrival.

6. Pay for overtime, compensatory time and court time shall be at the employee's option.

7. A minimum of two hours overtime shall be provided for all call-in overtime.

8. All overtime accumulated in the officer's overtime bank shall be paid, at the then rate of base pay and at the time-and-one-half rate, to the officer when he leaves the Department or, upon his death, to his widow and/or beneficiary.

9. Each July 15th, the Chief of Police will provide to each member of the bargaining unit a list showing accumulated overtime in each employee's overtime bank. If an employee believes that an error has been made, he shall notify the Chief of Police by no later than August 15th. If the employee believes the list to be correct, he shall, as well, notify the Chief of Police by no later than

August 15th. The final list will be given to all bargaining unit members by no later than August 20th.

10. Predetermined overtime will be posted for a minimum of 72 hours to allow time for officers to sign up for the overtime shift.

    Predetermined overtime shifts will be selected in the following order: first by the officer with the lowest amount of overtime listed for the year, continuing to the employee with the highest amount of overtime listed for the year. A written record of the officer's responses will be kept on file.

    The shift must be selected within 72 hours of posting the schedule. After 72 hours, no change to the schedule will be made, it is the responsibility of each officer to regularly check the schedule for availability of overtime.

    Once posted, any officer signing-up for an overtime shift must initial and date the schedule at the time of selecting the overtime shift.

    If no one signs up for a posted vacant shift, the officer on duty the shift prior to the vacant shift will work the vacant shift (i.e., not relieved of duty). If there is more than one officer on duty on the shift prior to the vacant shift, the officer with the lowest number of overtime hours will have first choice to work. If neither officer accepts the overtime, the senior officer will decide who will work the vacant shift. No officer shall work more than sixteen (16) consecutive hours.

    The vacant shift may be split with the officer that is due to report to work for the shift following the vacant shift, if that officer chooses to report early for his regular shift. If not, the officer on the shift prior will work the entire shift.

11. The following procedures must be followed to cover a police officer shift call-in:

    a. If an officer calls in for a shift that would create overtime: No schedules shall be switched, nor part time officers called to cover the overtime needed, without first completing ARTICLE 26, sections 11(b) thorough (g).

    b. The Police Officer on duty must remain on duty until relieved. No officer shall be scheduled for more than sixteen (16) consecutive hours of work.

    c. The senior officer on duty shall call all police officers, starting with the officer with the lowest accumulated overtime. This includes the Chief of Police and the Sergeant(s).

    d. When leaving a voice message on an employee's answering machine, the message must contain all the following information:

        (i) Callers name

        (ii) Time of call.

        (iii) Reason for the Call.

    e. The officer on duty shall allow five (5) minutes waiting period from the time of leaving the message to allow that employee to return the call before calling the next person.

f. It is understood that the officer on duty will use reasonable judgment when calling for overtime. For example, there should be a minimum of two (2) hours available for overtime; not calling every officer for one (1) hour of overtime.

g. The Chief of Police or his designee has sole and final authority in determining the need for overtime and scheduling. If the officer list is exhausted and no officer has filled a shift under this Article or section C of the Department Policy for Filling of Shifts, the Chief of Police or his designee has sole and final authority in determining the need and filling of overtime created due to an officer call in, predetermined overtime, and/or scheduling in an emergency, including the ordering of officers to work to cover a shift.

h. Any violations of the overtime policy by the Administration will result in compensation of an amount equal to the current contract call-in time to those officer's that would have been available to work said shift. Any violations of the overtime policy by a police department employee will result in disciplinary action of eight (8) hours off without pay.

ARTICLE 27. GRIEVANCE PROCEDURE

1. STEP ONE. Any officer having an alleged grievance shall discuss the matter with a representative of the Union or local union representative within five (5) days of the occurrence.

2. STEP TWO. If not settled in this discussion, the grievance shall be presented in writing on a form supplied by the Michigan Fraternal Order of Police Labor Council signed by the aggrieved officer to the Chief of Police with the knowledge and grievance number of the FOPLC.

   The written grievance shall be discussed by the local union representative and/or FOPLC representative of the Union, the officer, and the Chief of Police. The Chief shall give his decision within five (5) days of receipt of the written grievance.

   The written grievance shall contain a factual statement outlining the acts constituting the grievance, the date, the time, and the place of occurrence and the relief requested. The written grievance shall contain a statement of the section(s) of the collective bargaining agreement to have been violated.

3. STEP THREE. If the alleged grievance remains unresolved within five (5) working days after the action of the Chief of Police, the grievance shall then be submitted to the City Manager, in writing, by the representative and the officer. The City Manager will present his decision in writing within five (5) working days. The local union representative and/or FOPLC representative and the officer shall submit their statement of position and all relevant information with such notice. If the grievance is not submitted within five (5) days, it will be considered closed based on the last disposition.

4. STEP FOUR. In the event the alleged grievance remains unresolved within five (5) working days, it shall be submitted to the City Police Board in writing by the representative of the FOPLC and/or local union representative and the officer. The Police Board will present their decision within five (5) working days, in writing.

5. STEP FIVE. In the event the alleged grievance is not settled in STEP FOUR, the Police Officers Association, represented by the Michigan Fraternal Order of Police Labor Council (FOPLC), shall have the right to request arbitration within fifteen (15) working days after receipt of the STEP

FOUR written determination from the City Police Board. Only the Michigan Fraternal Order of Police Labor Council (FOPLC) has the right to invoke arbitration on behalf of the employee. Should the parties fail to agree upon impartial arbitrator, then within a reasonable period, not more than ten (10) days after the end of said period, a request for a list of arbitrators will be made to either the American Arbitration Association (AAA), the Federal Mediation and Conciliation Service (FMCS), or the Michigan Employment Relations Commission (MERC), by the Michigan Fraternal Order of Police Labor Council (FOPLC). The parties will be bound by the rules and procedures of the arbitration service selected. Nothing shall preclude the parties from attempting to settle this dispute after request for arbitration has been made.

a. The arbitrator so selected will hear the matter promptly and will issue his/her decision no later than thirty (30) days from the date of the close of the hearings. The arbitrator's decision will be in writing and will set forth his/her findings of fact, reasoning and conclusion on the issue submitted.

b. The power of the arbitrator stems from this agreement, and his/her function is to interpret and apply this agreement and to pass upon the alleged violation submitted. He/she shall have no power to add to, subtract from or modify any terms of this Agreement. Further, the arbitrator shall have no authority to (I) substitute his/her discretion or judgment for employer's discretion or judgment with respect to any matter this Agreement consigns or reserves to employer's discretion or judgment, (2) interpret any policy, practice or rule except as necessary in interpreting or applying this Agreement, (3) formulate or add any new policy or rule (4) establish or change any wage or classification. The decision of the arbitrator shall be final and binding upon the Employer, the Union and the grievant.

c. The costs for the arbitrator's services, including his/her expenses, shall be borne equally by both parties. Each party shall pay for its own expenses for any witnesses called by them.

d. All claims for back wages shall be limited to the amount of wage that the employee would otherwise have earned less any unemployment compensation or compensation for personal services that he may have earned, or could with reasonable effort have earned, from any source during the period in question.

6. Any grievance that may arise must follow the steps of the above procedure as outlined or shall be considered dropped or automatically closed. All "days" stated in the above steps are to be considered "working days."

7. All records, reports, or other information pertaining to a pending grievance of an involved officer shall be made available as is legally required upon the aggrieved officers request and for inspection of the Union represented by the Michigan Fraternal Order of Police Labor Council (FOPLC).

8. No officer shall be discharged or remain disciplined except for just cause. The claim of any officer that he has been unjustly disciplined shall be processed as a grievance including, if necessary, arbitration.

9. A grievance affecting many employees may be treated as a policy grievance and entered directly into at the third step of the grievance procedure upon agreement by the City and the Union, represented by the Michigan Fraternal Order of Police Labor Council (FOPLC).

ARTICLE 28. WEAPONS, FIREARMS AND AMMUNITION

1. Employees must leave all City issued duty handguns in the Police Department at the end of each shift unless given permission by the Chief or his designee to take the weapon home for upcoming training or special event. While the firearms are in the employee's possession outside of the workplace, the firearms must be secured by lock and adequate security to prevent handling by anyone other than the employee.

2. Individual officer-issued secondary handguns, and/or off duty handguns, and/or assigned rifles, may be taken outside of the department at the end of the shift. The weapons may only be possessed and used by the employee for law enforcement purposes and/or training. While the firearms are in the employee's possession outside of the workplace, the firearms must be secured by lock and adequate security to prevent handling by anyone other than the employee.

3. The City shall pay the cost of the ammunition used in the mandatory annual qualifications with the second gun carried on duty only. The City has the right to inspect and record all information i.e. make, model and serial numbers, etc., of all hand guns owned by employees if carried on or off duty, under the badge and/or identification of the Police Department. This is to be conducted by a certified range officer and reported to the Chief of Police.

ARTICLE 29. DEFERRED COMPENSATION PLAN

The City agrees to allow any employee(s) of the Association who may so desire to enroll in the deferred compensation plan offered by the City. The plan administrator at the time of this contract agreement is MERS.

ARTICLE 30. ON DUTY SHOOTING INVOLVEMENT

In the event of a shooting while on duty, a department command officer shall debrief the officer to permit the officer's feelings to be heard and to deal with moral, ethical and/or psychological effects of the incident. This debriefing will be confidential and will take place before the end of the officer's shift.

The City will also immediately permit the officer to contact the appropriate firm or agency to obtain psychological counseling (if desired) during the shift in which such shooting occurred. Should the officer wish to avail himself of this psychological counseling, the City shall process the proper forms for a Workers Compensation claim within 24 hours of the incident. The City shall not incur any obligation for costs under this program and the officer shall not incur any detriment for such first counseling session.

In the event additional counseling is necessary, the counselor must submit a report to the City detailing such a need along with related details. Beyond the first counseling session, the standard contract provisions between the City of Pleasant Ridge and the Michigan Fraternal Order of Police Labor Council (FOPLC) shall prevail; for example, any such additional counseling sessions that require additional time off during the officer's regularly scheduled shift shall be charged against the officer's leave banks.

ARTICLE 31. MAINTENANCE OF OPERATORS LICENSE

Any employee that does, or may, as a part of his employment operate a City owned vehicle, must provide proof of a valid Michigan operator's license to the Chief of Police. Any change in such status must be

reported immediately to the Chief of Police. Failure to provide proof or report a status change may result in discipline.

ARTICLE 32. SECONDARY EMPLOYMENT

The City has developed a Secondary Employment Policy in coordination with the Union and Police Commissioner. The City reserves the right to alter or change the policy whenever deemed to be in the best interest of the City and will notify the Union before making any changes. It is agreed that violations of the existing Secondary Employment Policy will result in disciplinary action by the City.

ARTICLE 33. MERS CONFERENCE

The City shall allow one union member to attend the Municipal Employees Retirement System conference held each year. The city shall pay for lodging and transportation expenses incurred by the officer.

ARTICLE 34. CONTRACTUAL UNDERSTANDING

The City and the Union agree that this contract will be reopened if the City is implementing salary or wage cuts for all full-time non-union employees due to a property tax revenue decline of 5% or more in any one fiscal year. The purpose of reopening the contract shall be to negotiate salary or wage adjustments for union employees. The City agrees that any requested reductions in salary or wages for members of the union may not exceed the percentage reductions in salary or wages being implemented for all non-union employees. If salary or wage cuts are later restored or partially restored for non-union employees, they shall be equally restored or partially restored for union employees.

The City shall provide at least 30 days advance written notice to the Union if the contract is to be reopened under the terms of this section.

ARTICLE 35. EMERGENCY MANAGER

An emergency manager appointed under the Local Financial Stability and Choice Act shall be allowed to reject, modify, or terminate this collective bargaining agreement as allowed in the Act.

ARTICLE 36. DURATION

1. This Agreement shall be effective as of July 1, 2022 and shall remain in full force and effect through June 30, 2025.

2. If negotiations extend beyond the expiration date of this Agreement, the terms and provisions of this Agreement shall remain in full force and effect, pending agreement upon a new contract.

3. This agreement incorporates the entire understanding of the parties on all issues that were or could have been the subject of negotiations.

ARTICLE 37. SAVINGS AND SEVERABILITY

If any article or section of this Agreement or any supplement thereto, should be held invalid by option of law or by any tribunal of competent jurisdiction, or if compliance with or enforcement of any Article or Section should be restrained by such tribunal, the remainder of the Agreement and supplements shall not be affected. Thereby, and the parties shall enter immediate collective bargaining negotiations to arrive at a mutually satisfactory replacement for such Article or Section.

IN WITNESS WHEREOF, the parties hereto have executed this agreement this ____ day of _____, 2022.

CITY OF PLEASANT RIDGE

_____

Bret Scott, Mayor

MICHIGAN FRATERNAL ORDER OF POLICE LABOR COUNCIL

_____

Scott Harding

FOPLC Labor Representative

Attest:

_____

Amy Allison, City Clerk

_____

Jeremy Waters, Union President

Approved as to substance:

_____

James Breuckman, City Manager

Approved as to form:

_____

Ryan Fantuzzi, City Labor Attorney

SOCRRA
Community Partners in Recycling & Waste

Berkley • Beverly Hills • Birmingham • Clawson • Ferndale • Hazel Park • Huntington Woods • Lathrup Village • Oak Park • Pleasant Ridge • Royal Oak • Troy

May 2, 2022

Amy Allison
City Clerk
City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, MI 48069

Subject: Appointment of Representative & Alternate

Dear Ms. Allison:

Article VII of the Articles of Incorporation of SOCRRA provides that each municipality shall annually appoint a representative and an alternate to the Board of Trustees. This representative shall serve during the next fiscal year following his appointment and/or until his successor is appointed.

The present representative and alternate representative for the City of Pleasant Ridge are as follows:

Representative	Alternate
J. Breuckman	A. Allison

It is requested that the City Commission, by resolution, appoint a representative and alternate representative to represent the City of Pleasant Ridge on the Board of Trustees of SOCRRA for the fiscal year beginning July 1, 2022.

Please forward a certified copy of this resolution to SOCRRA, 3910 W. Webster Road, Royal Oak, MI 48073-6764.

Very truly yours,

Jeffrey A. McKeen, P.E.
General Manager

JAM/cf

* Berkley * Beverly Hills * Bingham Farms * Birmingham
* Clawson * Huntington Woods * Lathrup Village * Pleasant Ridge
* Royal Oak * Southfield * Southfield Township

May 2, 2022

Amy Allison
City Clerk
City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, MI 48069

Subject: Appointment of Representative & Alternate

Dear Ms. Allison:

Article VII of the Articles of Incorporation of the Southeastern Oakland County Water Authority provides that each municipality shall annually appoint a representative and an alternate to the Board of Trustees. This representative shall serve during the next fiscal year following his appointment and/or until his successor is appointed.

The present representative and alternate representative for the City of Pleasant Ridge are as follows:

Representative	Alternate
J. Breuckman	A. Allison

It is requested that the City Commission, by resolution, appoint a representative and alternate representative to represent the City of Pleasant Ridge on the Board of Trustees of the Southeastern Oakland County Water Authority for the fiscal year beginning July 1, 2022.

Please forward a certified copy of this resolution to the Southeastern Oakland County Water Authority, 3910 W. Webster Road, Royal Oak, MI 48073-6764.

Very truly yours,

Jeffrey A. McKeen, P.E.
General Manager

JAM/cf

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: June 9, 2022

Re: Proposed Fiscal Year 2023 Budget

Overview

Attached is the proposed Fiscal Year 2023 budget which will take effect July 1 of this year, if approved.

Background

After two years of disruption due to the COVID pandemic, local operations have returned to a mostly normal state. City facilities returned to normal hours and schedules over the past year, and we have restored all our normal functions and services. The world is still dealing with supply chain impacts, inflationary pressures, and other ongoing extraordinary pressures. These national and global factors do impact our local operations, but we have been able to maintain normal operations.

Revenue

- Assessed property values increased by 6% this past year. Our total taxable value grew 5.7% due to home sales causing the taxable value on many properties to be uncapped. When a home sale occurs, the taxable value is uncapped and is reset to equal the assessed value of the property.

- The State inflation rate multiplier for FY23 is 3.3%, which is much lower than inflation has been running in recent months. The state IRM for this coming budget year was calculated using the October 2020 – October 2021 time frame. Inflation has increased since October of 2021, so we expect next year's inflation rate multiplier to be higher.

Millage Rates

- Our local tax rate has been again adjusted downward by Headlee to ensure that total property tax revenues only increase 3.3% compared to last year.

- The voters approved a 3.5 mill water infrastructure millage in November 2021. The proposed budget implements the Water Infrastructure Citizen's Advisory Committee's recommendation to fund 1/3 of the water infrastructure project using water infrastructure millage funding, which results in a water infrastructure millage levy of 1.6987 mills, a bit less than half of what was approved by the voters.

- The City Commission is proposing to reduce the parks improvement millage from 2021's 0.6557 mills to 0.1290 mills in 2022 – a reduction of over 0.5 mills. We can do this by using the City's recreation endowment fund (SCAF-PSRF, Fund 258) revenues to replace money that would have been generated by the parks improvement millage. This action helps to reduce the impact of the new water infrastructure millage.

- The total City property tax rate will increase from 21.3110 mills in 2021 to 21.9997 mills in 2022. This is an increase of 0.6887 mills. With the new water infrastructure millage adding 1.6987 mills, the City's other millages are being reduced by about 1 mill due to Headlee and the decision to reduce the parks improvement millage.

Accomplishments

With the budget uncertainty due to COVID, and the supply chain and inflationary impacts since, capital projects have been either delayed or cancelled. Furthermore, our attention has been diverted to planning for the water infrastructure project which will almost completely reconstruct the City's water distribution system. Nonetheless, this past year we:

- Replaced 33 lead service lines.
- Constructed the new pavilion at Gainsboro Park.
- Continued street tree plantings – we have now planted over 525 new street trees over the past six years.
- Purchased new pool furniture with Foundation support.
- Continued to address our unfunded pension liability. Starting in FY18-19 and continuing for the next 10 years we will be making additional contributions to eliminate that unfunded liability. We can do this because of the police pension millage that was approved by the voters in November 2017.
- Secured $650,000 in direct Federal money for the Kensington water main and lead service line replacement project, scheduled to begin in FY23.
- Gained MDOT design approval for the Woodward Streetscape project to add green infrastructure and a two-way, sidewalk level cycle track along northbound Woodward. Construction will begin on this project this summer. The project is being funded by over $1 million in grants from EGLE and MDOT, with the local match being provided by the DDA.

Our efforts in recent years have substantially overhauled our recreation facilities, improved City Hall, addressed infrastructure needs, and provided our police with the up-to-date equipment they need to do their jobs.

Challenges

We have made great progress in addressing challenges to the City in recent years, and the City is on its most stable footing in decades. This is largely due to the voters supporting operating and police pension millages over the past five years that provide funding to replace that which was lost after the recession that began in 2008 and the nearly $300,000 annual reduction in revenue sharing support we receive from the State. We have also implemented measures to reduce operating and employee benefit costs which put us on a sustainable path into the future.

However, there will always be challenges facing the City:

- The largest challenge facing the City is our aging water infrastructure and State mandate to remove all lead from the water distribution system.

  The water distribution system is functioning well with very few breaks or service issues. Our water testing continues to show that the quality of water in our system meets all State requirements for purity, including lead and copper levels.

  However, the water distribution system is nearing 100 years old, and our water mains are reaching the limits of their design life.

  The new State-imposed requirement that we replace all lead service lines in the water system over the next 20 years took effect this past year. The State is mandating that the City replace private water service leads as part of this work, so not only do we have to replace the public portion, but we must also replace the service line from the water stop box all the way to the meter inside of each house.

  Our $25 million water infrastructure replacement project will replace nearly all water mains and all lead service lines in the City over the coming 25-30 years.

  We have concluded a year of intensive discussion around how to pay for this project. A millage was passed by the voters in November 2021. The Citizen's Advisory Committee (CAC) studied how best to fund the water infrastructure project, making a recommendation in April of this year. The proposed budget and water rate structure implement the recommendation of the CAC.

- The City's pension system is currently 56% funded, with the police group, which accounts for about two-thirds of the overall pension system, being 48% funded. The pension system became underfunded over the course of multiple decades, and it will take us a decade or more to restore the pension system to a fully funded state.

  The overall funding level has been stable at 53% for the past four years, so we have managed to arrest the decline in funding levels. The good news is that the passage of the police pension millage by the voters in November of 2017 will provide new funding over the next 15 years that will be dedicated solely to increasing the funding level of the police pension group. This additional funding, along with the changes we have made in benefits provided to recent and future hires, has placed us on a sustainable path towards eliminating our unfunded liability in the pension system over time.

Projections

We continue to present a three-year budget. The budget now shows FY23 budget numbers to be adopted, alongside projections for FY24 and FY25 (only the FY22 budget is adopted, the two following years are for planning purposes only). The presentation of three budget years helps the City to plan for future expenses, and to ensure that budgetary decisions for the coming year consider future events and expenditures in the interest of making sound budget decisions. Examples include setting aside money each year in the capital improvement fund to support the purchase of a police car every other year. In this way, we can plan to fund large, non-annual capital expenditures over multiple budget years rather than bearing the full cost in one budget year. The three-year projection is also used to set utility rates for the coming year, smoothing out large capital expenditures over three years to avoid large increases in utility rates in any given year.

Conclusion

I thank the Commission and our residents for the trust and support that you provide to City Staff, and I thank all our talented City employees for their dedicated efforts. We have a small group of City employees who wear many hats, and I am proud that they always go above and beyond to provide excellent service to our residents. Most of all, we acknowledge that the community-mindedness and support of our residents is the primary reason that Pleasant Ridge is such a great City.

Requested Action

City Commission approval of the FY23 budget following the public hearing.

City of Pleasant Ridge
FY23 Annual Budget

Public Hearing Draft: May 5, 2022

Mayor
Bret Scott

City Commissioners
Chris Budnik
Alex Lenko
Ann Perry
Katy Schmier

City Manager
James Breuckman

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A. Introduction

1. City Manager's Letter

May 5, 2022

RE: Proposed Fiscal Year 2023 Operating Budget

Honorable Mayor Scott and members of the Pleasant Ridge City Commission:

Please accept this letter as my transmittal of the City budget for fiscal year 2023 for your review and consideration. A public hearing to solicit public comment on this document is scheduled for June 14, 2022 at 7:30pm.

Overview

After two years of disruption due to the COVID pandemic, local operations have returned to a mostly normal state. City facilities returned to normal hours and schedules over the past year, and we have restored all of our normal functions and services. The world is still dealing with supply chain impacts, inflationary pressures, and other ongoing extraordinary pressures. These national and global factors do impact our local operations, but we have been able to maintain normal operations.

Assessed property values increased by 6% this past year. Our total taxable value grew 5.7% due to home sales causing the taxable value on many properties to be uncapped. When a home sale occurs, the taxable value is uncapped and is reset to equal the assessed value of the property.

The State inflation rate multiplier for FY23 is 3.3%, which is much lower than inflation has been running in recent months. The state IRM for this coming budget year was calculated using the October 2020 – October 2021 time frame. Inflation has increased since October of 2021, so we expect next year's inflation rate multiplier to be higher.

Millage Rates

- Our local tax rate has been again adjusted downward by Headlee to ensure that total property tax revenues only increase 3.3% compared to last year.

- The voters approved a 3.5 mill water infrastructure millage in November 2021. The proposed budget implements the Water Infrastructure Citizen's Advisory Committee's recommendation to fund 1/3 of the water infrastructure project using water infrastructure millage funding, which results in a water infrastructure millage levy of 1.6987 mills, a bit less than half of what was approved by the voters.

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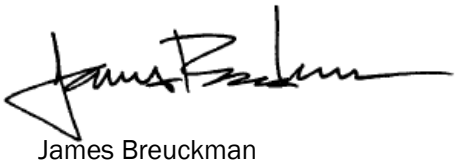
Respectfully,



James Breuckman
City Manager

2. Public Hearing Notice – Proposed FY23 Budget

City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

NOTICE OF A PUBLIC HEARING ON THE PROPOSED
FY 2023 CITY BUDGET AND 2022 MILLAGE RATES

NOTICE IS HEREBY GIVEN in accordance with Section 4.03 of the Pleasant Ridge City Charter that a public hearing will be held in the City Commission chambers at Pleasant Ridge City Hall, 23925 Woodward Avenue on Tuesday, June 14, 2022, at 7:30 p.m.

THE PROPOSED FY 2023 COMBINED CITY BUDGET AND MILLAGE RATES.

The current FY22 (July 1, 2021 through June 30, 2022) and the proposed FY23 (July 1, 2022 through June 30, 2023) millage rates are as follows:

	FY22	FY23
General Operating - Charter	9.8903	9.6885
General Operating (2015)	2.5359	2.4841
General Operating – Police Pension	1.3032	1.2766
Community Promotion	0.2850	0.2700
Infrastructure Improvement	2.5968	2.5438
Parks Improvement	0.6557	0.1290
Rubbish	1.4829	1.4526
Pool Operations	1.1009	1.0784
Library	0.3503	0.3380
Pool and Recreation Facility Debt	1.1100	1.0400
Water Infrastructure (2021)	0.0000	1.6987
Total Millage:	21.3110	21.9997

The City may not adopt its proposed FY 2023 budget until after the public hearing. A copy of the proposed FY 2023 budget and the proposed 2022 property tax millage rates are available for public inspection during normal business hours in the office of the City Clerk, at 23925 Woodward Avenue, Pleasant Ridge, Michigan. Public comments, oral or written, are welcome at the hearing on the proposed budget for Fiscal Year 2023 and the proposed property tax millage rate. All interested citizens are encouraged to attend and to submit comments.

Amy M. Allison
City Clerk

Published: The Daily Tribune
____ __ , 2022
AFFIDAVIT REQUESTED

3. Budget Resolution

City of Pleasant Ridge
Budget Resolution
General Appropriations Act
Fiscal Year 2023

WHEREAS, the City Manager has prepared and submitted to the City Commission the proposed budget for fiscal year 2023; and

WHEREAS, the City Commission has advertised the tentative millage rates in the Daily Tribune on May __, 2022, and held the public hearing on the budget and the tentative millage rates pursuant to Section 16 of the Uniform Budgeting and Accounting Act (Truth in Budgeting) on Tuesday, June 14, 2022; and

WHEREAS, the City Commission has reviewed the proposed property tax rates and budget.

NOW, THEREFORE LET IT BE RESOLVED, that the budget for fiscal year 2023 commencing July 1, 2022 and ending June 30, 2023 be adopted; and

BE IT FURTHER RESOLVED, that the revenue and transfers-in, and expenditures and transfers-out for the fiscal year 2023 are estimated as follows and hereby appropriated by the City Commission to meet the liabilities of the City of Pleasant Ridge in the ensuing fiscal year as follows:

REVENUES

101	GENERAL FUND	
	Taxes and special assessments	$2,548,919
	Licenses and Permits	$100,300
	Federal and State Grants	$24,000
	State Shared Revenue	$299,674
	Charges for Services	$232,085
	Fines and Forfeits	$87,500
	Interest and Rents	$17,000
	Other revenue	$79,750
	Transfers-In	$0
	Total General Fund Revenue:	$3,389,227
202	MAJOR STREETS	$228,644
203	LOCAL STREETS	$83,738
218	INFRASTRUCTURE IMPROVEMENTS	$713,486
226	SOLID WASTE	$439,850
251	POOL/FITNESS FACILITY	$236,440
258	SCAF PARKS SPECIAL REVENUE FUND	$60,000
259	SCAF REMAINDER FUND	$24,649
260	DOWNTOWN DEVELOPMENT AUTHORITY	$106,320
266	DRUG FORFEITURE FUND	$0
271	LIBRARY SERVICES	$60,674
297	HISTORICAL FUND	$3,610
301	DEBT SERVICE - VOTED	$191,720
401	CAPITAL IMPROVEMENTS	$175,000
592	WATER and SEWER	$2,868,226

EXPENDITURES

101	GENERAL FUND	
	Mayor and Commission	$27,550
	City Manager	$215,683
	Elections	$10,760
	City Attorney	$26,500
	City Clerk	$123,840
	Information Technology	$74,000
	General Government	$189,950
	Cable TV	$2,910
	City Treasurer	$128,300
	Assessment	$22,670
	Police Services	$1,395,128
	Fire/Rescue	$256,581
	Building Department	$84,991
	Planning Commission	$0
	Public Works	$307,918
	Street Lighting	$46,500
	Recreation	$333,055
	Retirement Services	$5,000
	Transfers Out	$100,000
	Total General Fund Expenditures:	$3,351,336
	Increase in General Fund Fund Balance:	$37,891
202	MAJOR STREETS	$273,000
203	LOCAL STREETS	$99,200
218	INFRASTRUCTURE IMPROVEMENTS	$1,045,325
226	SOLID WASTE	$438,156
251	POOL/FITNESS FACILITY	$238,277
258	SCAF PARKS SPECIAL REVENUE FUND	$75,000
259	SCAF REMAINDER FUND	$200
260	DOWNTOWN DEVELOPMENT AUTHORITY	$301,250
266	DRUG FORFEITURE FUND	$0
271	LIBRARY SERVICES	$61,509
297	HISTORICAL FUND	$3,950
301	DEBT SERVICE - VOTED	$197,462
401	CAPITAL IMPROVEMENTS	$115,100
592	WATER and SEWER	$3,081,572

BE IT FURTHER RESOLVED, the following property tax rates be authorized and that the City Treasurer is ordered to levy such funds and rates and collect and deposit the various specific uses and funds as required by ordinance and resolution:

General Operating - Charter	9.6885
General Operating (2015)	2.4841
General Operating – Police Pension	1.2766
Community Promotion	0.2700
Infrastructure Improvement	2.5438
Parks Improvement	0.1290
Rubbish	1.4526
Pool and Recreation Facility Operations	1.0784
Library	0.3380
Pool and Recreation Facility Debt	1.0400
Water Infrastructure	1.6987
Total Millage:	21.9997

BE IT FURTHER RESOLVED, that the City Commission recognizes that the City of Pleasant Ridge Downtown Development Authority will capture taxes levied from all millages,

BE IT FURTHER RESOLVED, that the City Treasurer shall levy a 1% Tax Administration Fee on all property taxes collected by the City of Pleasant Ridge from all taxing jurisdictions, as permitted by State Law.

AND, BE IT FINALLY RESOLVED, that the legal budgetary level be at the departmental level in the General Fund and at the fund level for all other funds as indicated above.

I, Amy M. Allison, duly certified clerk of the City of Pleasant Ridge, do hereby certify that the foregoing is a true and accurate copy of a resolution adopted by the City Commission of the City of Pleasant Ridge, County of Oakland, Michigan at the Regular City Commission Meeting held Tuesday, June 14, 2022.

Amy M. Allison, City Clerk

B. Budget Summary

1. Key Budget Information

All Funds Budget Summary

The following table presents key information and a summary of revenues and expenditures for all funds for the preceding five years, the proposed FY23 budget year, and the projected budget for the next two years. Note that the budget projections for FY24 and FY25 are for planning purposes only and are not adopted budgets.

		Actual 2018-19	Actual 2019-20	Actual 2020-21	Budget 2021-22	Budget 2022-23	Projected Budget 2023-24	Projected Budget 2024-25
Assessed Valuation								
	Real	203,876,640	210,406,390	217,633,410	230,661,630	244,608,060	252,680,126	260,260,530
	Personal	2,052,320	2,157,500	3,004,390	3,056,030	3,103,350	3,205,761	3,301,933
	Total	**205,928,960**	**212,563,890**	**220,637,800**	**233,717,660**	**247,711,410**	**255,885,887**	**263,562,463**
		7.3%	3.2%	3.2%	3.8%	6.0%		
Taxable Valuation								
	Real	150,913,980	158,053,770	163,959,250	170,496,900	180,377,680	186,330,143	189,125,096
	Personal	2,052,320	2,157,500	3,004,390	3,056,030	3,103,350	3,205,761	3,253,847
	Total	**152,966,300**	**160,211,270**	**166,963,640**	**173,552,930**	**183,481,030**	**189,535,904**	**192,378,943**
		7.9%	4.7%	4.2%	3.9%	5.7%		
Millage Rate								
	General Operating - Charter	10.3714	10.2085	10.0604	9.8903	9.6885	9.4947	9.3048
	General Operating - 2015	2.6593	2.6175	2.5795	2.5359	2.4841	2.4344	2.3857
	General Operating - Police Pension	0.3500	0.7	1.0500	1.3032	1.2766	1.2511	1.2260
	Community Promotion	0.3200	0.3100	0.2994	0.2850	0.2700	0.2646	0.2593
	Infrastructure - 2015	2.7232	2.6804	2.6415	2.5968	2.5438	2.4929	2.4431
	Parks Improvement - 2015	0.6877	0.6769	0.6670	0.6557	0.1290	0.1264	0.1239
	Rubbish	1.5551	1.5306	1.5084	1.4829	1.4526	1.4235	1.3951
	Pool Operations	1.1546	1.1364	1.1199	1.1009	1.0784	1.0568	1.0357
	Library - 2015	0.3675	0.3617	0.3564	0.3503	0.3380	0.3312	0.3246
	Pool Debt	1.2500	1.1900	1.1700	1.1100	1.0400	1.0192	0.9988
	Water Infrastructure	0.0000	0.0000	0.0000	0.0000	1.6987	1.6647	1.6314
	Total	**21.4388**	**21.4120**	**21.4525**	**21.3110**	**21.9997**	**21.5597**	**21.1285**
Total Revenues								
101	General Fund	3,166,466	3,140,795	3,359,716	3,271,095	3,389,227	3,473,709	3,560,978
202	Major Streets	179,847	189,216	207,253	185,050	228,644	234,980	238,175
203	Local Streets	143,700	118,569	124,914	115,540	83,738	156,329	158,353
218	Infrastructure Improvements	442,791	445,628	451,029	447,000	713,486	553,550	569,112
226	Solid Waste	397,018	399,613	414,681	418,599	439,850	454,255	469,136
251	Pool/Fitness Facility	219,268	189,548	224,456	229,556	236,440	244,063	251,938
258	SCAF Parks Special Revenue Fund	134,022	118,972	591,449	50,000	60,000	61,980	64,025
259	SCAF Remainder Fund	106,349	119,364	115,020	112,601	24,649	25,413	238,459
260	Downtown Development Authority	96,578	102,854	133,632	108,323	106,320	109,733	113,346
266	Drug Forfeiture Fund	0	0	0	0	0	0	0
271	Library Services	55,481	57,058	58,279	59,375	60,674	62,676	64,744
297	Historical Fund	3,172	13,171	881	5,610	3,610	3,610	3,610
301	Debt Service - Voted	192,813	192,071	196,172	192,644	191,720	198,017	204,522
401	Capital Improvements	222,940	197,530	150,990	100,000	175,000	100,000	100,000
592	Water and Sewer	1,313,312	1,411,878	1,503,962	1,996,950	2,868,226	2,233,829	2,451,494
	Total	**6,673,757**	**6,696,267**	**7,532,434**	**7,292,343**	**8,581,584**	**7,912,144**	**8,487,892**

		Actual 2018-19	Actual 2019-20	Actual 2020-21	Budget 2021-22	Budget 2022-23	Projected Budget 2023-24	Projected Budget 2024-25
Total Expenditures								
101	General Fund	2,954,829	2,888,175	2,883,105	3,226,131	3,351,336	3,437,851	3,524,517
202	Major Streets	140,639	183,049	186,392	195,500	273,000	233,479	239,438
203	Local Streets	104,758	128,519	155,255	116,700	99,200	149,200	154,200
218	Infrastructure Improvements	1,044,890	904,331	363,775	368,500	1,045,325	399,925	549,300
226	Solid Waste	375,893	400,421	405,186	424,014	438,156	452,175	466,668
251	Pool/Fitness Facility	237,151	147,417	114,839	208,017	238,277	244,449	250,824
258	SCAF Parks Special Revenue Fund	0	100,000	100,000	0	75,000	0	212,257
259	SCAF Remainder Fund	23,700	207	227	200	200	200	200
260	Downtown Development Authority	28,860	56,779	86,749	91,250	301,250	111,250	111,250
266	Drug Forfeiture Fund	0	0	0	0	0	0	0
271	Library Services	55,582	56,726	57,763	58,289	61,509	63,533	65,624
297	Historical Fund	3,445	6,150	320	6,280	3,950	3,950	3,950
301	Debt Service - Voted	194,275	188,213	182,900	203,837	197,462	191,087	209,712
401	Capital Improvements	223,820	260,473	166,676	125,100	115,100	115,100	55,100
592	Water and Sewer	1,158,377	1,135,851	1,724,007	1,554,543	3,081,572	1,552,698	3,226,890
	Total	**6,546,219**	**6,456,311**	**6,427,194**	**6,578,361**	**9,281,337**	**6,954,897**	**9,069,930**
End of Year Fund Balance								
101	General Fund	980,448	1,233,021	1,709,638	1,754,602	1,792,493	1,828,351	1,864,812
202	Major Street Fund	113,055	119,222	140,083	129,633	85,277	86,778	85,515
203	Local Street Fund	104,608	94,658	64,319	63,159	47,697	54,826	58,978
218	Infrastructure Improvements	1,174,672	715,968	803,223	881,723	549,884	703,510	723,322
226	Solid Waste Fund	37,811	37,003	46,498	41,083	42,777	44,857	47,324
251	Pool/Fitness Facility Fund	3,458	45,589	155,205	176,744	174,907	174,521	175,635
258	SCAF Parks Special Revenue Fund	2,383,037	2,402,009	2,893,457	2,943,457	2,928,457	2,990,437	2,842,205
259	SCAF Remainder Fund	608,781	727,938	842,730	955,131	979,580	1,004,793	1,243,052
260	Downtown Development Authority	142,290	188,365	235,250	252,323	57,393	55,876	57,972
266	Drug Forfeiture Fund	429	429	429	429	429	429	429
271	Library Fund	10,576	10,908	11,424	12,510	11,675	10,818	9,938
297	Historical Fund	7,072	14,093	14,654	13,984	13,644	13,304	12,964
301	Debt Service Fund	13,415	17,274	30,546	19,353	13,611	20,542	15,352
401	Capital Improvements	281,932	218,989	203,304	178,204	238,104	223,004	267,904
592	Water and Sewer	1,000,625	1,276,652	919,280	1,361,687	1,148,341	1,829,472	1,054,076
	Total	**6,862,209**	**7,102,118**	**8,070,040**	**8,784,022**	**8,084,269**	**9,041,516**	**8,459,478**

Grant Summary
Following is a summary of grants awarded to the City of Pleasant Ridge from 2015 to-date.

Year	Grant	Amount
2015	Tree Planting (DTE Energy Foundation/MDNR)	$4,000
2015	Woodward Corridor Neighborhood Bicycle Network (MDOT Transportation Alternatives Program)	$2,200
2015	Woodward Streetscape Tree Plantings (MDOT)	$2,580
2016	Community Energy Management (Michigan Energy Office)	$5,825
2016	Gainsboro Park Project (CN EcoConnexions From the Ground Up/America In Bloom)	$25,000
2017	Oakland County Local Road Improvement Program	$5,627
2017	Filmer Trust Community Center Park Grant	$10,000
2018	Tree Planting (DTE Energy Foundation/MDNR)	$3,000
2018	Oakland County Local Road Improvement Program	$8,865
2018	Filmer Trust Community Center Big Room Grant	$10,000
2019	SEMCOG Multi-Community Planning Grant – Woodward Bike & Pedestrian Audit (joint grant with Ferndale)	$50,000
2019	EGLE (Michigan Department of Environment, Great Lakes, and Energy) 319 Nonpoint Source Pollution Control Grant – Woodward Avenue Streetscape	$608,498
2020	MDOT (Michigan Department of Transportation) Transportation Alternatives Program – Woodward Cycle Track	$402,332
2020	Oakland County Local Road Improvement Program	$9,755
2020	MDOT Tree Planting	$5,000
2021	Oakland County Local Road Improvement Program	$9,497
2021	MDOT (Michigan Department of Transportation) Transportation Alternatives Program – Woodward Moves Complete Streets Plan	$354,766
2022	Oakstem Tree Planting Grant	$6,000
2022	Federal Community Project Funding – Kensington Water Main	$650,000

2. Summary Graphs and Tables

General Fund Revenue Trends. The following Figure 1 shows general fund revenue trends for the 1985-2022 period. All dollar values are adjusted into 2022 equivalent dollars to provide a consistent point of comparison.

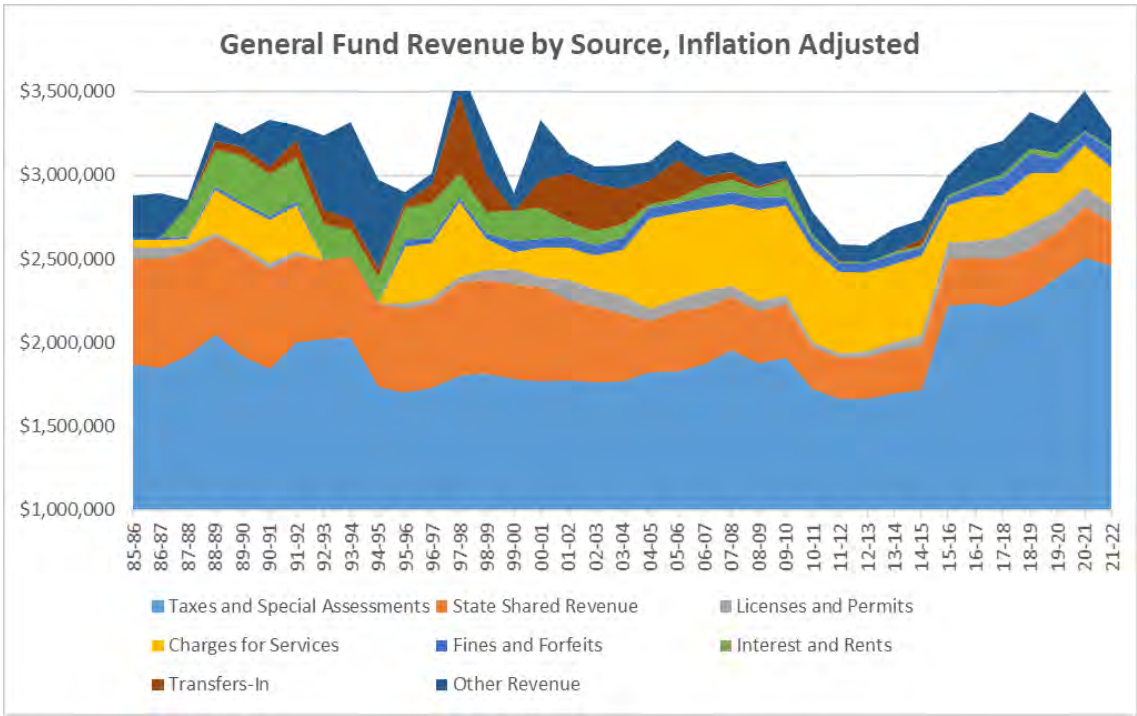
The figure shows that state revenue sharing as a source of general fund revenue has dropped precipitously over the years. In 1985 it provided the equivalent of about $630,000 in today's dollars, while it is projected to provide less than half of that - $252,000 - in FY23. Thus, other sources of revenue have had to be found over the years and service cutbacks have been made to compensate for revenue sharing reductions.

Total inflation-adjusted general fund revenue was consistent at about $3.15 million per year between 1988 and 2010. From FY11 through FY15, general fund revenue dropped to about $2.65 million per year. With the voter-approved passage of the general operating millage in November 2014, general fund revenue has returned to close to its long-term average at about $3.2 million starting with FY16 and continuing through FY22.

While the City continues to operate and provide the level of service that has come to be expected by our residents, the reality is that we have had to tax ourselves at a higher rate to do so. Whatever tax reductions have been implemented at the State level have been offset by our need to increase local property tax rates.

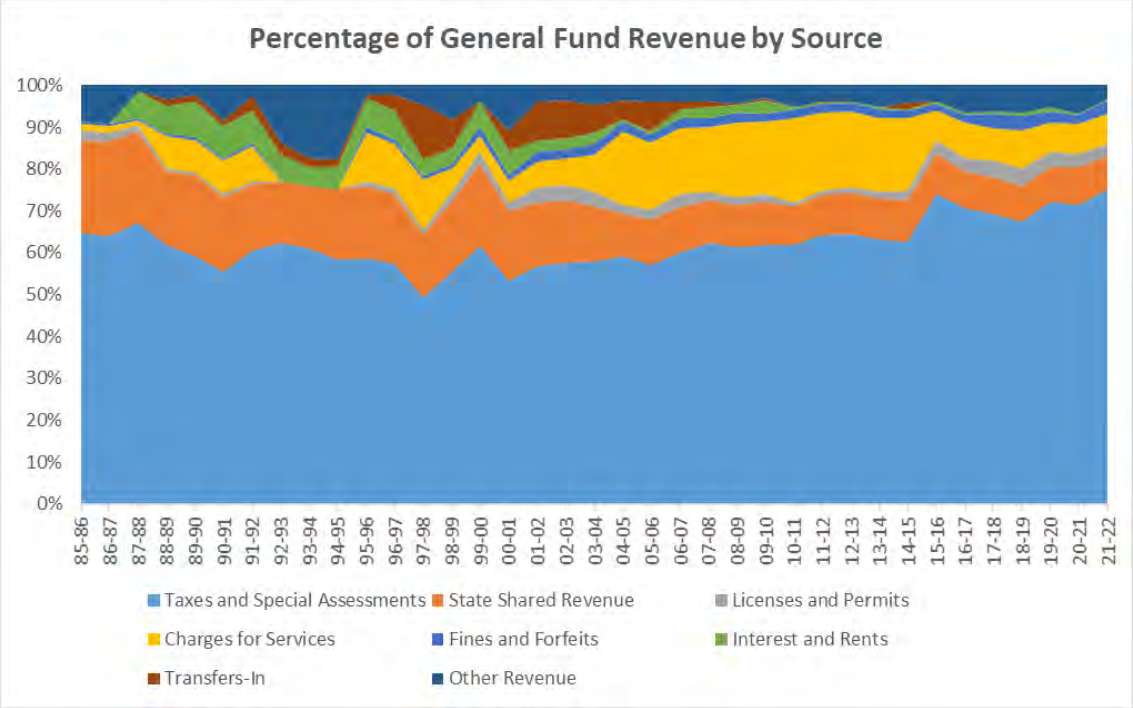
Figure 2 presents the same data as Figure 1, except that each revenue source is presented as a percentage of the whole. This figure demonstrates that as other funding sources have decreased the general fund has become more reliant on locally generated property tax revenue. Today, property taxes provide 75% of general fund revenue, compared to an average of 59% of revenue over the 1985-2014 period.

Figure 1. General Fund Revenues by Source, Adjusted for inflation in 2019 equivalent dollars, 1985-Present



Source: Pleasant Ridge Budget Documents and BLS CPI-U data for the Detroit-Ann Arbor-Flint MSA

Figure 2. Percentage of General Fund Revenue by Source, 1985-Present



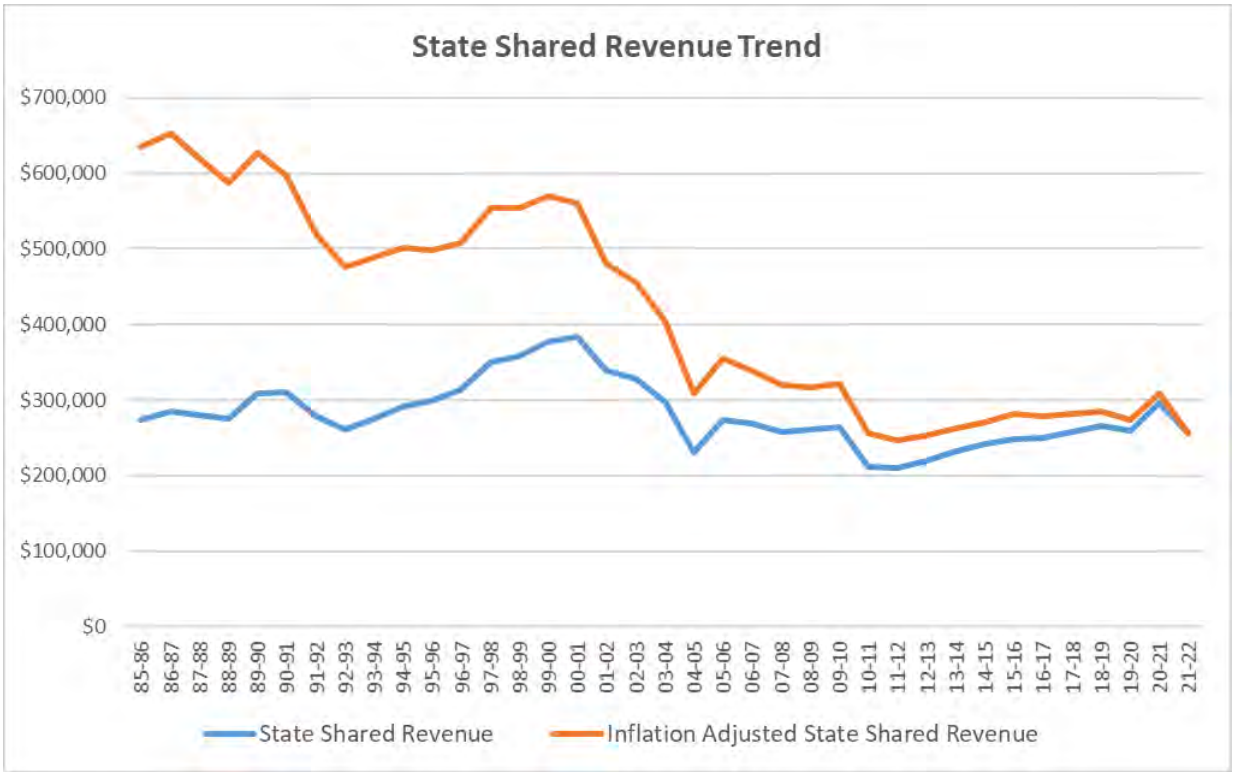
Source: Pleasant Ridge Budget Documents and BLS CPI-U data for the Detroit-Ann Arbor-Flint MSA

State Shared Revenue Trend. One of the main drivers impacting Pleasant Ridge's general fund budget over the past 15 years has been the decline in state shared revenues. Figure 3 shows that, on an inflation adjusted basis, State revenue sharing has declined from the equivalent of nearly $630,000 per year in the late 1980s to about $250,000 today. Shared revenues represented 23% of the City's general fund revenues in 1985, while today they represent just 8.4%.

Even on a non-inflation adjusted basis, the City received over $300,000 from the state in the early 1990s, while this budget year we expect to receive about $252,000.

Much of the financial stress under which local units of government operate today is explainable by this figure. It is an unfortunate fact that local municipalities have had to tax themselves at higher rates to make up for losses in shared revenues coming from the State. Had the State fulfilled its constitutional and statutory obligation to continue to fund local governments, Pleasant Ridge would be able to reduce local property taxes by 2.5 mills a year; to invest in pressing issues such as our underfunded pension, public infrastructure; or some combination thereof.

Figure 3. Pleasant Ridge State Shared Revenue, 1985-Present



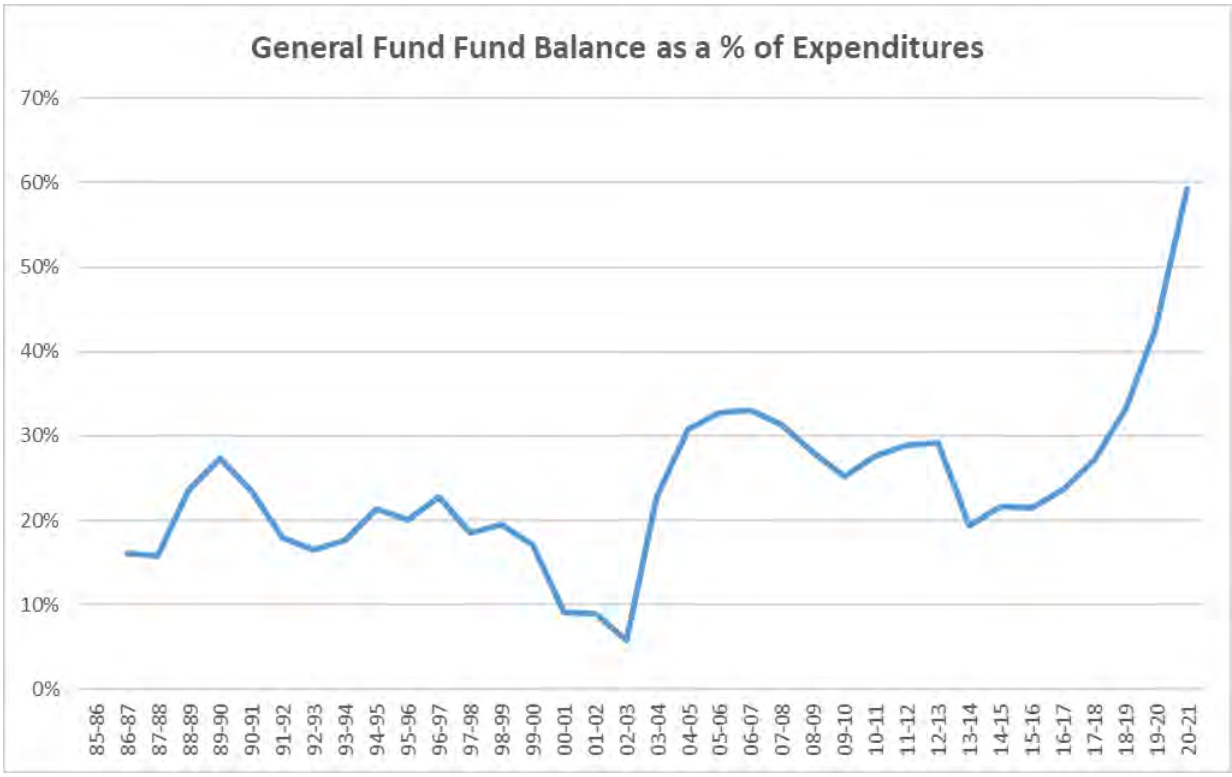
Source: Pleasant Ridge Budget Documents and BLS CPI-U data for the Detroit-Ann Arbor-Flint MSA

General Fund Fund Balance Trends. The Government Finance Officers Association (GFOA) recommends that local governments maintain a minimum of two-months' worth of expenses, or 16.66%, in unrestricted fund balance. It is further recommended that a small unit of government like Pleasant Ridge maintain a higher fund balance due to the small size of our budget and the ability for relatively small, unexpected expenses to dramatically impact our fund balance. Accordingly, it is the stated policy goal of the City to maintain a general fund balance equal to 75% of general fund expenditures.

Figure 4 shows the long-term trend for Pleasant Ridge's fund balance as a percentage of general fund expenditures. Since FY14 fund balance has been steadily increasing due to focused efforts by the City and is projected to be nearly 60% at the end of FY22.

The proposed FY23 budget proposes a modest increase in fund balance. Outside pressures such as increasing annual required pension contributions continue to pressure our bottom line, although the police pension millage approved by the voters in November 2017 has offset increasing costs related to our underfunded pension plan and will allow the City to eliminate the unfunded liability over time.

Figure 4. General Fund Fund Balance as a Percentage of Expenditures, 1985-Present

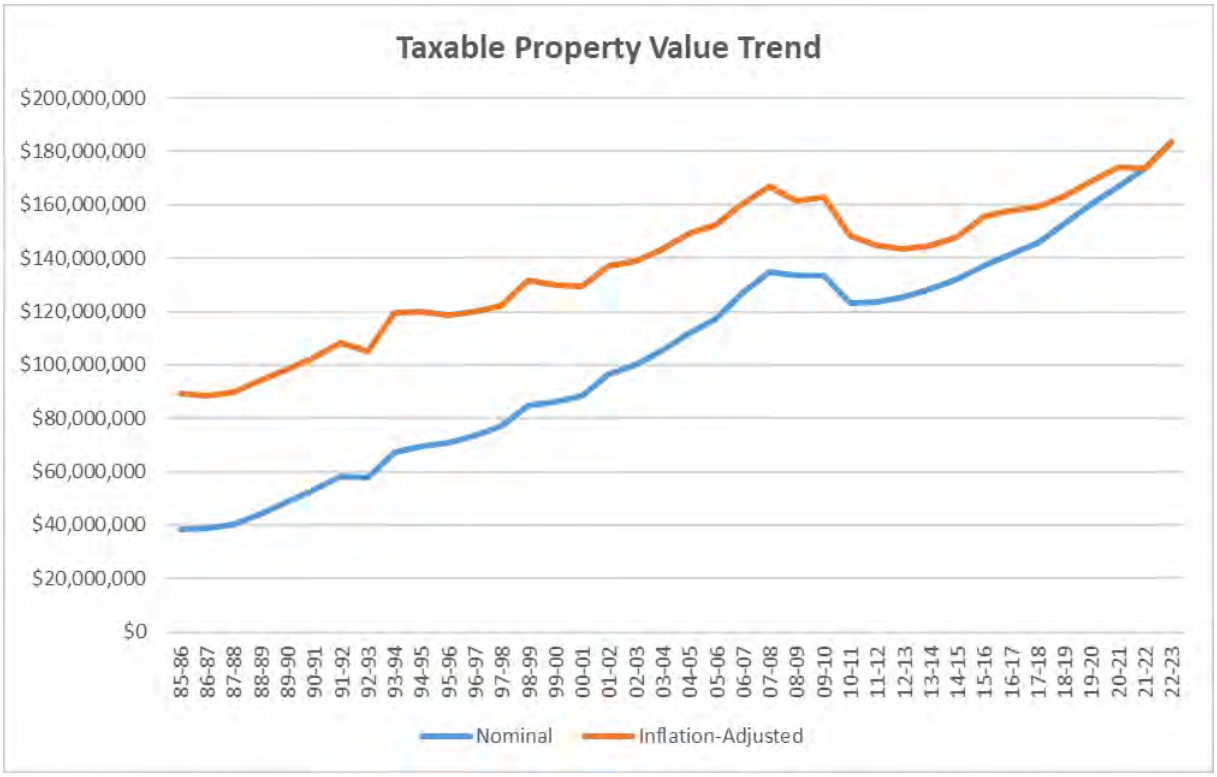


Property Value Trends. The following Figure 5 shows total (real + personal) taxable property value trends in the City of Pleasant Ridge. The inflation adjusted taxable property value has increased at a rate of about 1.8% per year. This small increase over the inflation rate is the result of certain development activities that are exempt from Headlee rollback, most notably new construction.

The figure also shows the impact of the recent recession on taxable property values. In nominal terms, it took until 2015 for the City's tax base to again equal the peak pre-recession value from 2007 in nominal terms.

However, on an inflation-adjusted basis it took the City until 2019 to return to 2007 taxable value levels. This chart highlights the issues with Headlee and Prop A, which allow for unlimited declines in taxable property values during recessions and downturns but limit the restoration of taxable property values to the rate of inflation.

Figure 5. Pleasant Ridge Taxable Property Value, 1985-Present

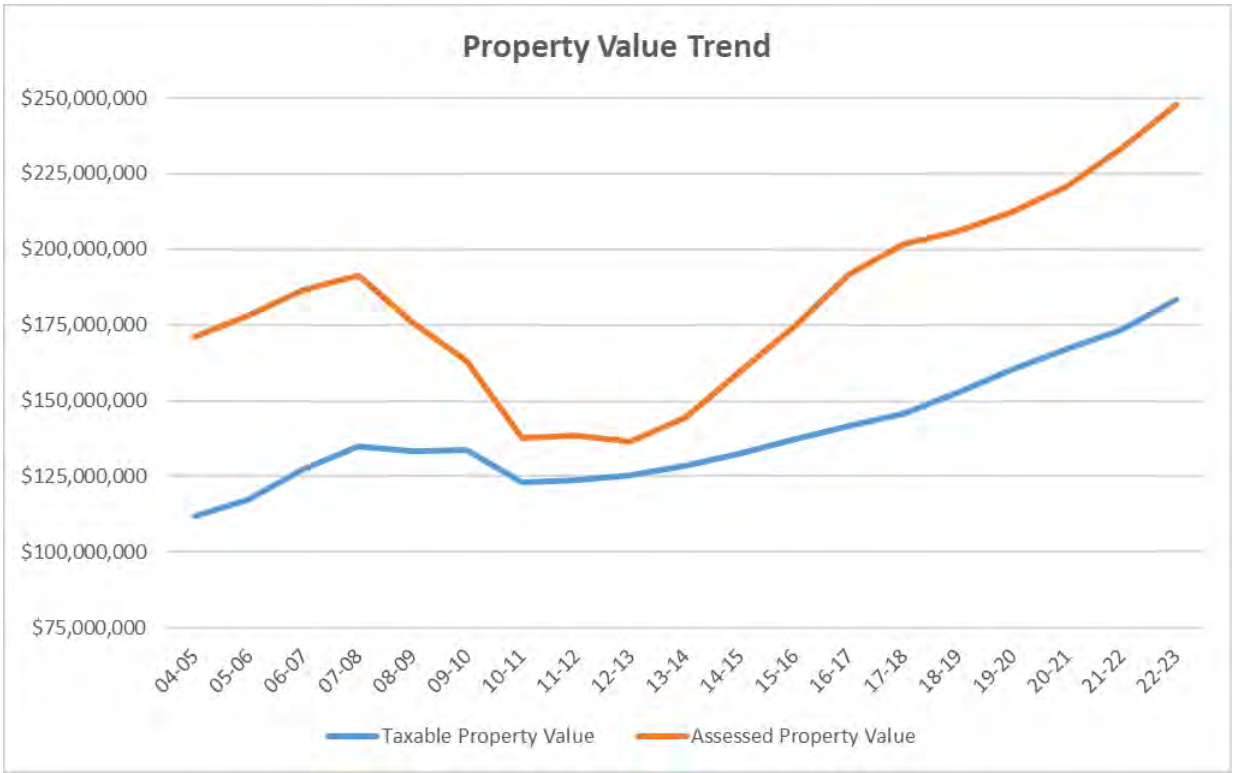


The following Figure 6 shows how Pleasant Ridge's total assessed and taxable property values have changed over time since 2004. Assessed value is the true market value of all property in the City as determined by Oakland County Equalization (the City's assessor). Taxable value is the value of property against which property taxes are levied.

The taxable value of a property may not increase more than 5% or the rate of inflation in any given year, whichever is lower. Over time, assessed property values tend to rise faster than taxable property values. The cap on taxable property value is removed when a property is sold, and the taxable value for that property becomes equal to the assessed value in the year following the sale.

When properties become uncapped, they usually cause the City's total taxable property value to increase at a rate higher than inflation. To compensate for this, the Headlee Amendment then adjusts the City's millage rate down to ensure that the total tax revenue collected by the City does not increase at a rate higher than inflation.

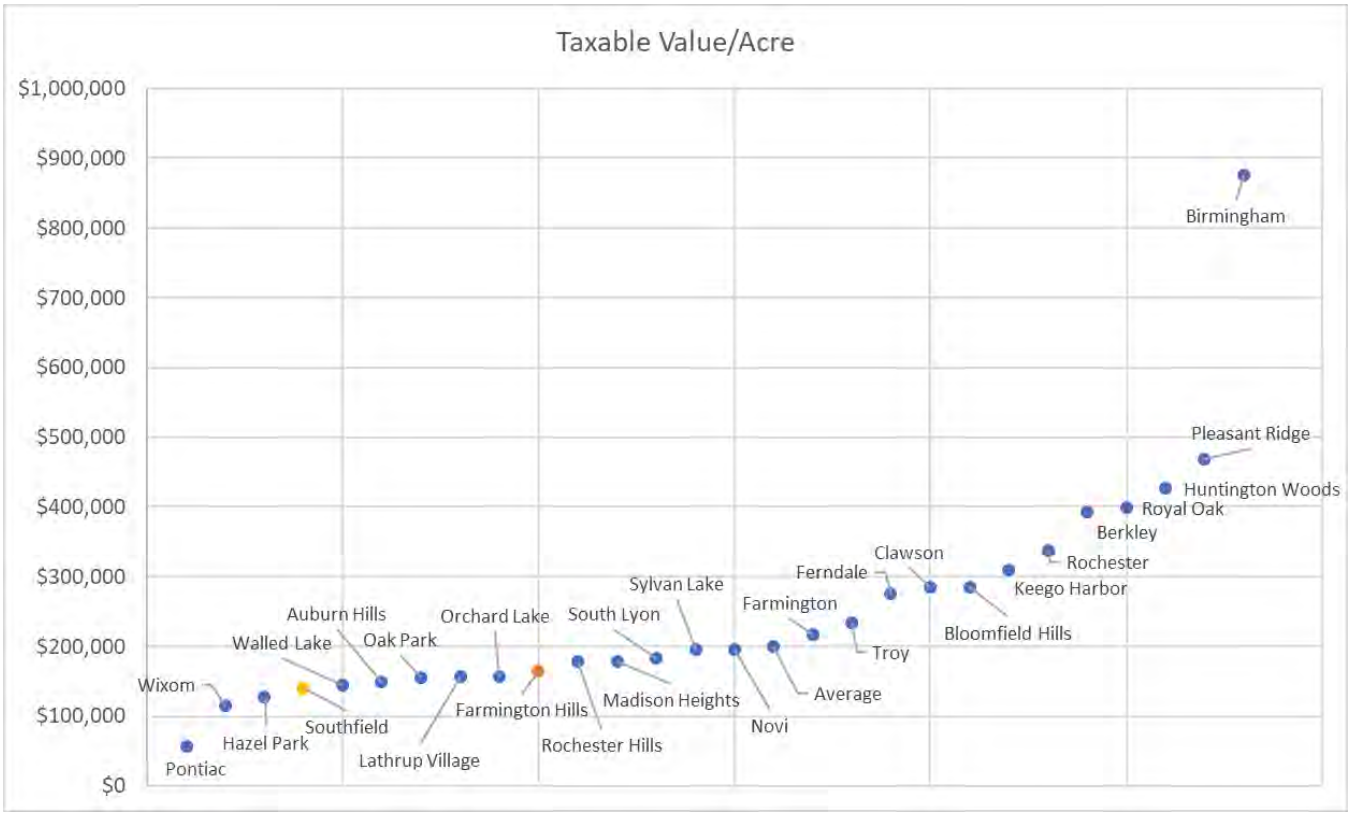
Figure 6. Taxable and Assessed Property Value, 2004-Present



Taxable Value per Acre. Property tax revenue is generated by multiplying the value of land by a property tax millage rate. While we tend to think about taxable value in terms of an entire City, or for individual parcels, a way of comparing how productively land is used in different communities is by looking at taxable value per acre of land. A community with a higher taxable value per acre has a stronger base from which to sustain itself. A standard residential street costs about the same to maintain regardless of where it is, but a community that has a higher value per acre has greater intrinsic resources to be able to pay for maintenance of that infrastructure.

The following Figure 7 shows that Pleasant Ridge has the second highest taxable value per acre in the County. This attests that 1) Pleasant Ridge is a desirable place to live, and 2) that our development pattern is inherently more sustainable than many newer communities. Older communities, particularly ones that have downtowns, have higher value per acre across the county than newer automobile-oriented communities. In the long run, more compact, walkable places generate more value per acre of land and have a stronger base from which to sustain themselves and their infrastructure into the future.

Figure 7. Taxable Value per Acre, Oakland County Cities, 2022



3. City Commission Goals and Objectives

Following are the City Commission's FY23 goals and objectives. These goals and objectives form the basis for evaluating and prioritizing budgeting decisions.

Note that the order in which these goals are presented is not intended to convey importance.

a. Goal: Maintain a Safe and Secure Community

Objectives:

(1) As COVID continues to evolve, maintain safe conditions at all City facilities and adjust City services and events to protect the health of residents and City Staff, as warranted.
(2) Preserve effective levels of police staffing and equipment to ensure high quality public safety service delivery.
(3) Maintain or improve existing fire/EMS service delivery.
(4) Implement traffic calming measures where necessary to ensure appropriate vehicle travel speeds.
(5) Preserve and enhance Neighborhood Watch program.

b. Goal: Ensure Good Stewardship of Municipal Infrastructure

Objectives:

(1) Implement the lead service line and water main replacement program according to the EGLE approved 30-year asset management plan.
(2) Implement a continuing maintenance program for previously reconstructed streets and alleys to extend their useful life.
(3) Implement continuing maintenance and monitoring program for previously rehabilitated combined sewers to extend their useful life.
(4) Improve bike and pedestrian infrastructure (sidewalks) throughout the city.
(5) Complete capital projects identified in the Capital Improvements Plan.
(6) Work with local transit authorities to improve public transportation options for residents and visitors.

c. Goal: Maintain Financial Sustainability

Objectives:

(1) Maintain a competitive property tax rate position relative to other cities in the region.
(2) Maintain an unrestricted fund balance between 70% and 80% of general fund expenditures to protect the City from future uncertainties.
(3) Maintain a capital outlay reserve of 50% of expenditures in the Water and Sewer Enterprise Fund.
(4) Continue to explore other revenue sources including grant opportunities.
(5) Continue extra contributions to the defined benefit pension to reduce the City's unfunded liability.

d. Goal: Maintain an Excellent Parks and Recreation Program

Objectives:

(1) Continue necessary maintenance tasks at the community center, pool, and parks.
(2) Achieve excellence in the offering and delivery of recreation services to residents of all ages.
(3) Encourage active, healthy lifestyles for City residents.
(4) Continue incremental facility upgrades at the wellness and community center and City parks.

e. Goal: Preserve and Enhance Community & Neighborhood Character

Objectives:

(1) Deliver consistent code enforcement efforts to effectively preserve the character of the City's neighborhoods.
(2) Protect the City's established historic character from destruction or erosion by inappropriate additions or modifications to existing buildings, or inappropriate construction of new buildings.
(3) Work to influence future changes and enhancements to Woodward Avenue, including the underpass and the I-696 intersection, to reflect Pleasant Ridge's preferred plan.
(4) Ensure that planning, development, and infrastructure projects enhance Pleasant Ridge as a walkable, bikeable community.
(5) Continue to foster a welcoming community to all people.
(6) Ensure the transition of the Roosevelt school building from Lower Elementary to C.A.S.A. does not negatively impact the neighborhood.

f. Goal: Foster Community Trust & Participation

Objectives:

(1) Use a variety of outlets, including the City's website, email list, traditional media, social media, town hall meetings, and the Ridger to inform and engage residents.
(2) When more than one feasible choice exists for issues of major consequence, consult or collaborate with residents prior to making decisions.
(3) Encourage, support, and recognize volunteers and community members who do good work in the community.
(4) Conduct a community survey every five years to measure City performance in delivering services and public sentiment on important issues facing the community.
(5) Support resident-driven and managed initiatives.
(6) Continue to evaluate and improve digital communications.

g. Goal: Strive for Excellence in Governance

Objectives:

(1) Develop and maintain a first-rate workforce by supporting continued training and professional development for City employees.
(2) Continue to pursue excellence in customer service by exploring alternative methods for improving delivery of services.

(3) Invest in increased use of technology to support large meetings at the Community Center.
(4) Continue to look for new ways to partner with nearby communities or private partners to improve the delivery of City services.
(5) Continually evaluate and adjust the City's goals and objectives, Master Plan, Recreation Master Plan, and Capital Improvements Plan to ensure that policy decisions are being made that further the long-term interest of the City.

h. **Goal: Protect the Environment**

Objectives:

(1) Reduce the City's carbon footprint through energy conservation, efficiency, and renewable generation measures.
(2) Invest in maintaining the City's tree canopy by maintaining existing trees and planting new trees to fill gaps.
(3) Explore ways to incorporate green infrastructure to infiltrate stormwater in place and reduce the amount of runoff that enters the City's sewer system.

4. Budget Policies and Procedures

a. **Role of the Budget**

The budget provides the annual financial plan for the management of the City's affairs. The document compiles the financial data needed to support Pleasant Ridge's comprehensive decision making/policy development process. This Budget is based on the City Commission's Goals and Objectives, the Capital Improvements Plan, the City's financial policies, and City Manager and departmental review of operations.

b. **Budget Strategy**

The current financial plan is based upon Commission direction and current revenue constraints. These factors govern the stewardship of public funds and reflect the following principles:

(1) Basic services will be maintained at least at current levels and will be funded adequately.
(2) Program costs will reflect the true picture of the cost of operations. Depreciation will not be included in program costs (except in the enterprise fund), and some City-wide expenses will be separated from program expenditures for ease of administration.
(3) Program services will be provided in the most efficient method while meeting the needs of the public.
(4) Necessary infrastructure improvements will be completed to meet needs.
(5) Revenue will be estimated at realistic levels.
(6) Reserves will be programmed at appropriate levels to protect the City from future uncertainties. It is the City's goal to maintain unappropriated general fund reserves of at least 25% of general fund expenditures.
(7) The budget will comply with provisions of the State Constitution, City Charter, Municipal Code, and sound fiscal policy.

c. **Balanced Operating Budget**

A balanced budget is a basic budgetary constraint intended to ensure that the City does not spend beyond its means. The City must function within the limits of the financial resources available and under normal circumstances requires commitment to a balanced budget. The appropriated budget cannot exceed available resources, defined as revenues generated in the current period added to balances carried forward from prior years. Any deviation from a balanced operating budget requires disclosure when it occurs.

d. **Impact of Capital Budget on the Operating Budget**

As new policies and programs are approved, both the operating and capital budgets are impacted. For example, an increase in service levels approved as part of the operating budget would have long-term effects on the Capital Improvements Program. Conversely, a restrictive change to the use of long-term debt would slow capital programs.

Regardless of the difference between the operating and capital budgets, the two are interdependent. Budgetary policy states that all foreseeable operating costs related to capital projects be estimated and provided for as part of the review process associated with the Capital Improvements Program. In addition, departments are required to include costs associated with operating and maintaining capital projects that are requested for the upcoming year.

e. **Budgeting Controls**

(1) Internal Controls. The annual adopted budget provides a basis of control over financial operations. The objective of these budgetary controls is to ensure compliance with legal

provisions embodied in the approved budget. Activities of the General Fund and Special Revenue Funds are included in the annual approved budget. The level of budgetary control (that is the level at which expenditures cannot exceed the appropriated amount) is established by function and category (Personnel Services, Supplies, Other Services and Charges, Capital Outlay and Debt Service) within each individual fund.

(2) Independent Audit. State statutes and the City Charter require an annual audit of all accounts of the City by certified public accountants selected by the City Commission. Maner Costerisan Certified Public Accountants has fulfilled this requirement. The auditor's report is included in the City's Comprehensive Annual Financial Report (CAFR) and is available to the public on the City's website and through the State of Michigan Department of Treasury local audit and finance division website.[1]

[1] See: https://treas-secure.state.mi.us/LAFDocSearch/ for CAFR files for units of local government from 2003 to present

5. Fund Structure

The accounts of the City are organized by funds and account groups, each of which is considered a separate accounting entity. Funds are established to segregate specific activities or objectives of a government in accordance with special regulations, restrictions, or limitations. The various funds are grouped into generic fund types in two broad categories as follows:

a. *Governmental Funds*

(1) General Fund: The general fund contains the records of the ordinary activities of the City that are not accounted for in another fund. General fund activities are financed by revenue from general property taxes, state shared revenue and other sources.

(2) Special Revenue Funds: Special revenue funds are used to account for the proceeds of earmarked special revenue from financing activities requiring separate accounting because of legal or regulatory provisions. Special revenue funds include Major Streets, Local Streets, Infrastructure, Solid Waste, Pool/Community Center Operations, Segregated Capital Asset Fund (SCAF), Library Services, and Parks Capital Improvement Fund.

(3) Debt Service Funds: Debt service funds are used to account for the annual payment of principal and interest concerning certain long-term debt other than debt payable from the operations of an enterprise fund. The Pool/Community Center debt service fund is the City's only debt service fund.

(4) Capital Projects Funds: Capital projects funds are used to account for the development of capital facilities other than those financed by the operations of the enterprise fund.

b. *Proprietary Funds*

(1) Enterprise Fund: The water and sewer fund is used to account for the results of operations that provide a service to citizens financed by a user charge for the provision of that service.

6. Millage Rate Information

Millage Rate Information. The following Table 1 shows the breakdown of Pleasant Ridge millage rates from 2014 to present.

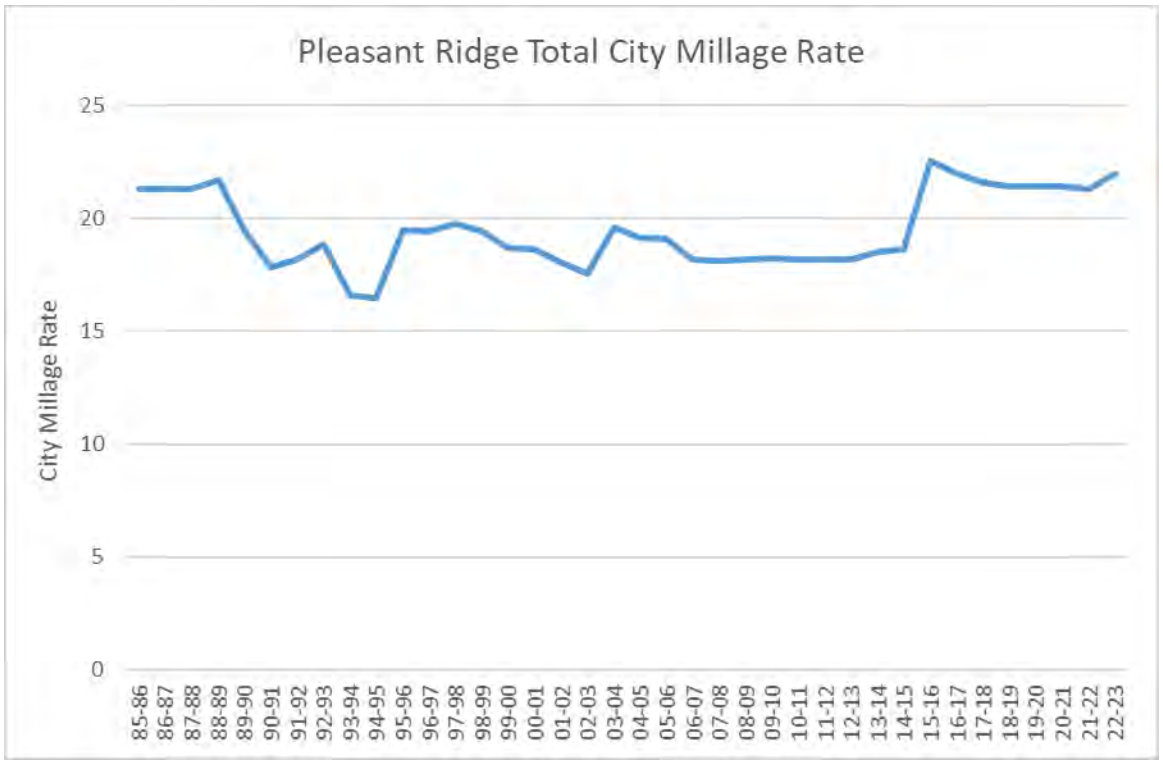
Table 1. Pleasant Ridge Property Tax Millage Components, 2014 to Present

	Original Amount	Final Levy*	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23
General Operating - Charter	20.0000	--	11.3094	11.1363	10.8434	10.6232	10.3714	10.2085	10.0604	9.8903	9.6885
General Operating (2015)	2.9000	--		2.8556	2.7804	2.7239	2.6593	2.6175	2.5795	2.5359	2.4841
Police Pension (2018)	1.400	2032					0.3500	0.7000	1.0500	1.3032	1.2766
Infrastructure (2015)	3.0000	2034	2.3880	2.9242	2.8472	2.7894	2.7232	2.6804	2.6415	0.285	0.2700
Community Promotion	0.3431	--		0.2704	0.3481	0.3375	0.3200	0.3100	0.300	2.5968	2.5438
Parks Improvement (2015)	0.7500	2024		0.7385	0.7190	0.7044	0.6877	0.6769	0.6670	0.6557	0.1290
Rubbish	3.0000	--	1.6960	1.6700	1.6260	1.5929	1.5551	1.5306	1.5084	1.4829	1.4526
Pool Operations (2003)	1.4000	2028	1.2593	1.2400	1.2073	1.1827	1.1546	1.1364	1.1199	1.1009	1.0784
Library (2019)	0.5000	2025	0.4949	0.3865	0.3763	0.3687	0.3675	0.3617	0.3564	0.3503	0.3380
Pool Debt (2003)	unlimited	2028	1.5000	1.3380	1.2123	1.2450	1.2500	1.1900	1.1700	1.11	1.0400
Water Infrastructure (2021)	3.5000	2051									1.6987
Total Millage			**18.6476**	**22.5595**	**21.9600**	**21.5677**	**21.4388**	**21.4120**	**21.4531**	**21.3110**	**21.9997**

* The year of final levy in the above table 1 is the last calendar year that the millage appears on the summer tax bill. A millage that is listed as expiring in 2032 will appear on summer taxes for the last time in 2032, during FY33.

The following Figure 8 shows the long-term total Pleasant Ridge city millage rate trend from 1985 to present.

Figure 8. Total City Millage Rate (Homestead), 1985-Present

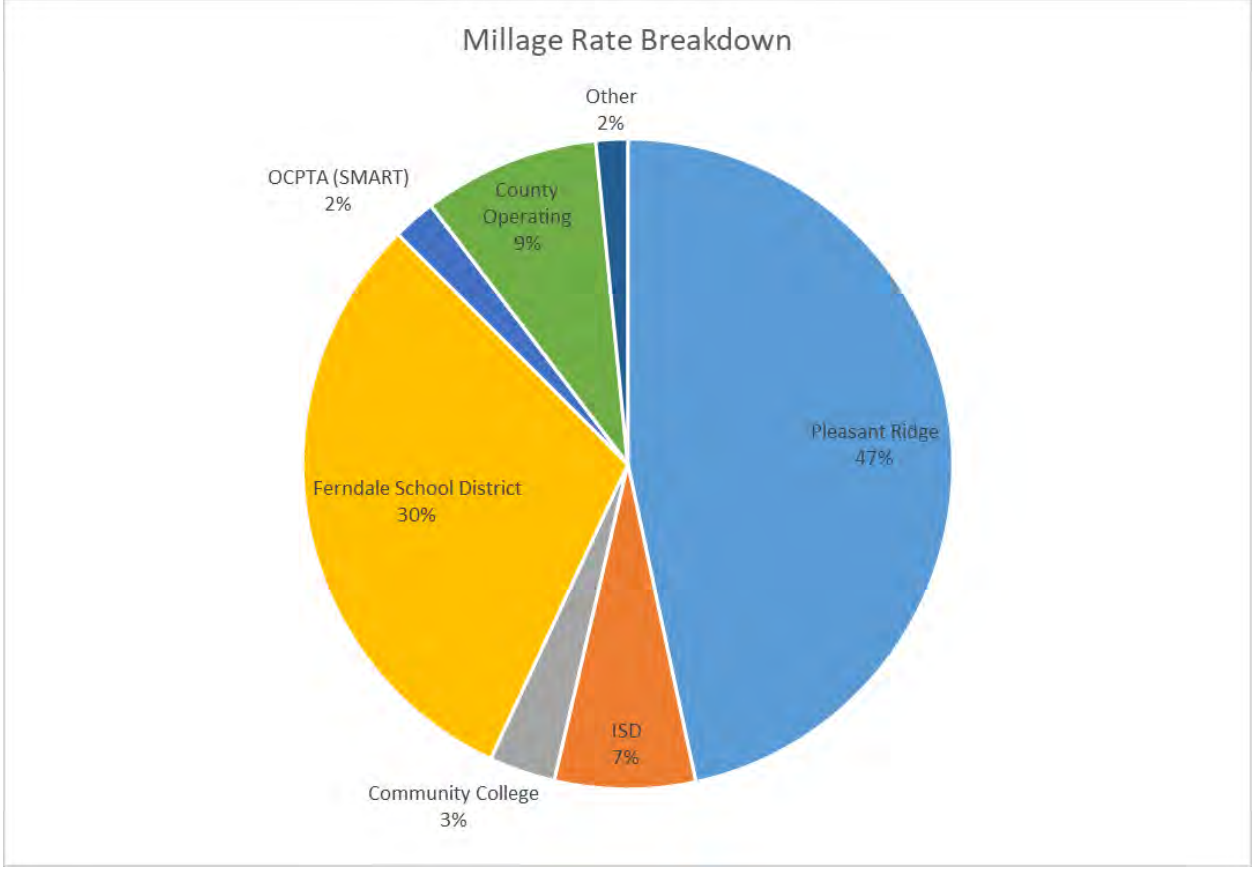


The 2022 total City millage rates increase by 0.6887 mills. The new water infrastructure millage levy is 1.6987 mills (out of 3.5 approved in November, 2021), the parks improvement millage is being reduced from 0.6557 mills to 0.1290 mills, and other City millages are being reduced by about 2.1% by Headlee. While the City experienced robust home sales and strong growth in sales prices, Headlee limits the City to a total tax revenue growth rate of 3.3%, requiring a rollback in local tax rates.

The community promotion millage authorized by PA 359 of 1925 (MCL 123.881) may generate up to $50,000 annually. The 0.2700 mill levy will generate about $48,450 for the City. The revenues are used to pay for communications and community publications such as the Ridger and website maintenance and upkeep.

Total Homestead Millage Rate Breakdown. The total homestead property tax rate for a property owner in Pleasant Ridge in 2021 is expected to be about 45.9961 mills.[2] Of every tax dollar paid by residents, 46% goes to the City, 31% goes to the Ferndale school district, and the remaining 23% goes to the County and other regional entities including SMART, the intermediate school district, community college, and "other" entities that include Oakland County Parks (0.2306 mills), the Detroit Zoo (0.0963 mills), the Art Institute Authority (0.1910 mills), and the Huron Clinton Metro Parks (0.2096 mills).

Figure 9. Total Pleasant Ridge Homestead Millage Rate Breakdown, 2022

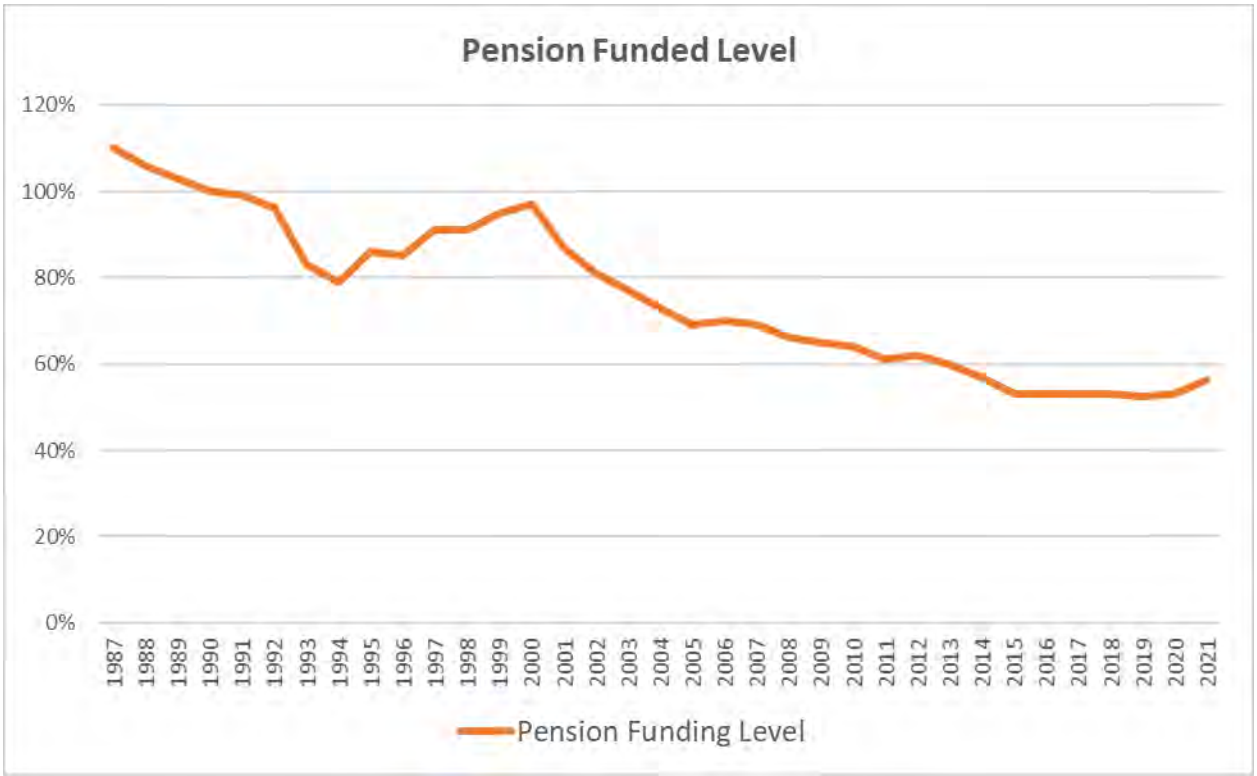


[2] As of the date of adoption of this budget, final tax rates for outside, non-Pleasant Ridge jurisdictions is not known. Those outside jurisdictions are also subject to Headlee Rollbacks, and their adopted tax rates have not yet been published. For the purposes of this document, the total millage rate uses estimated millage rates for non-Pleasant Ridge property taxes.

7. Pension Unfunded Liability

The City has had an underfunded pension fund since the early 2000s. The problem has grown steadily year over year since the early 2000s and has become an acute financial problem in recent years. The following Figure 10 summarizes the funding level of the City's pension funds (left scale).

Figure 10. City Pension Funding Level



The above Figure 10 shows that the City has experienced a decline from being close to 100% funded in the year 2000, to 56% funded in 2021. Over the same 2000 – 2021 period, pension costs have gone from 1.8% of general fund expenditures to 15% of general fund expenditures.

Passage of the police pension millage in November 2017 has allowed the City to increase our annual contribution to the pension fund and has helped stem the decline in funding level. However, MERS changed their actuarial assumptions again in 2019, reducing the expected rate of return on assets, which again has lowered the actuarial funded level of the pension fund.

The extra funding provided by the Police Pension millage has allowed the City to increase our annual contributions to the pension fund by 81%, from $287,000 in FY18 to $522,000 in FY23. While our pension funded level only modestly increased due to actuarial changes used by MERS, the additional funding has stopped the declines in our funding level. Over the coming decade we will continue to address the unfunded liability in our pension fund through increased contributions and as new police officers enter the new hybrid pension program, which is fully funded.

Actions Taken to Address Unfunded Liability

The 01, 02, 10, and 11 divisions are now closed to new hires. These represent the large majority of the fund's assets and liabilities. These groups include retired police officers and administrators, and employees hired before 2011.

Employees hired after 2011 are in different pension divisions with lower benefit levels and higher employee contribution amounts. The pension divisions for employees hired after 2011 – groups 12, 20, and HA are fully funded or nearly so. Divisions 12 and 20 are overfunded due to departure of employees before they vested, leaving excess funds in those groups. However, the total amount of valuation assets in divisions 12, 20 and HA are small, representing only 1.5% of the City's overall pension fund actuarial liability.

In short, the unfunded liability issue is one that we are on a path to resolving, but it will take time to unwind the underfunding status of older pension divisions.

The following table is reproduced from the City's most recent Annual Actuarial Valuation Report published by MERS shows accrued liabilities, assets, and funding levels for all the City's employee groups.[3]

Table 6: Actuarial Accrued Liabilities and Valuation Assets as of December 31, 2020

	Actuarial Accrued Liability							
Division	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
01 - Gnrl Oth	$ 0	$ 241,862	$ 307,080	$ 0	$ 548,942	$ 340,674	62.1%	$ 208,268
02 - Police	1,135,321	5,753	2,515,463	0	3,656,537	1,749,597	47.8%	1,906,940
10 - NonUnion	557,590	203,499	832,579	0	1,593,668	1,077,818	67.6%	515,850
11 - City Mgr	0	0	748,337	0	748,337	406,619	54.3%	341,718
12 - Non-Union after 7/1/2011	39,954	0	0	10,987	50,941	64,634	126.9%	(13,693)
20 - Police as of 7/1/2011	95,099	7,844	0	0	102,943	117,026	113.7%	(14,083)
HA - Police hired after 7/1/17	10,085	4,951	0	0	15,036	15,574	103.6%	(538)
Total	**$ 1,838,049**	**$ 463,909**	**$ 4,403,459**	**$ 10,987**	**$ 6,716,404**	**$ 3,771,942**	**56.2%**	**$ 2,944,462**

The above table shows that the City's total unfunded liability is $2,944,462, with over two-thirds of that unfunded liability being in the 02 – Police division. Given that the police group is the largest single source of the unfunded liability, the City has closed division 20 (which was created in 2011) and creating a new hybrid plan division HA for new police officers hired after July 1, 2017. The hybrid plan combines a defined benefit with a 401k-style defined contribution component as a way of further controlling the City's future pension liabilities.

Summary of Actions Taken

Following is a summary of actions taken by the City to address the unfunded liability issue:

- Police and Administrative divisions 02 and 10 were closed to new hires in 2011, replaced by divisions 12, 20, and HA with lower benefit levels. The new divisions are fully or nearly fully funded.
- City Manager division 11 closed in 2014. Current City Manager does not receive a defined benefit pension.
- Police employee contribution increased from 0% to 2.5% in 2011.
- New police hires will receive a hybrid plan that has a small pension that is combined with a defined contribution, 401k-style plan.

[3] AAV reports are available on the City's website at: https://cityofpleasantridge.org/lsvr_document/pension-fund-annual-actuarial-valuation-reports/

- No retirement health care benefit for any administrative employees hired after 2011 and police hired after 2017. Instead, employees have access to a Health Care Savings Plan that allows them to save for retirement health care costs with a small City match.

Police Pension Millage

The voters approved a 1.4 mill police pension millage in November of 2017, with the first levy of 0.35 mills beginning July 1, 2018 and phasing in at an additional 0.35 mills per year until the maximum levy is reached. FY22 was the first year the maximum levy was reached.

The FY23 levy is 1.2766 mills, which is expected to generate $229,087. The amount budgeted for police pension expenses for active and retired officers is $410,000.

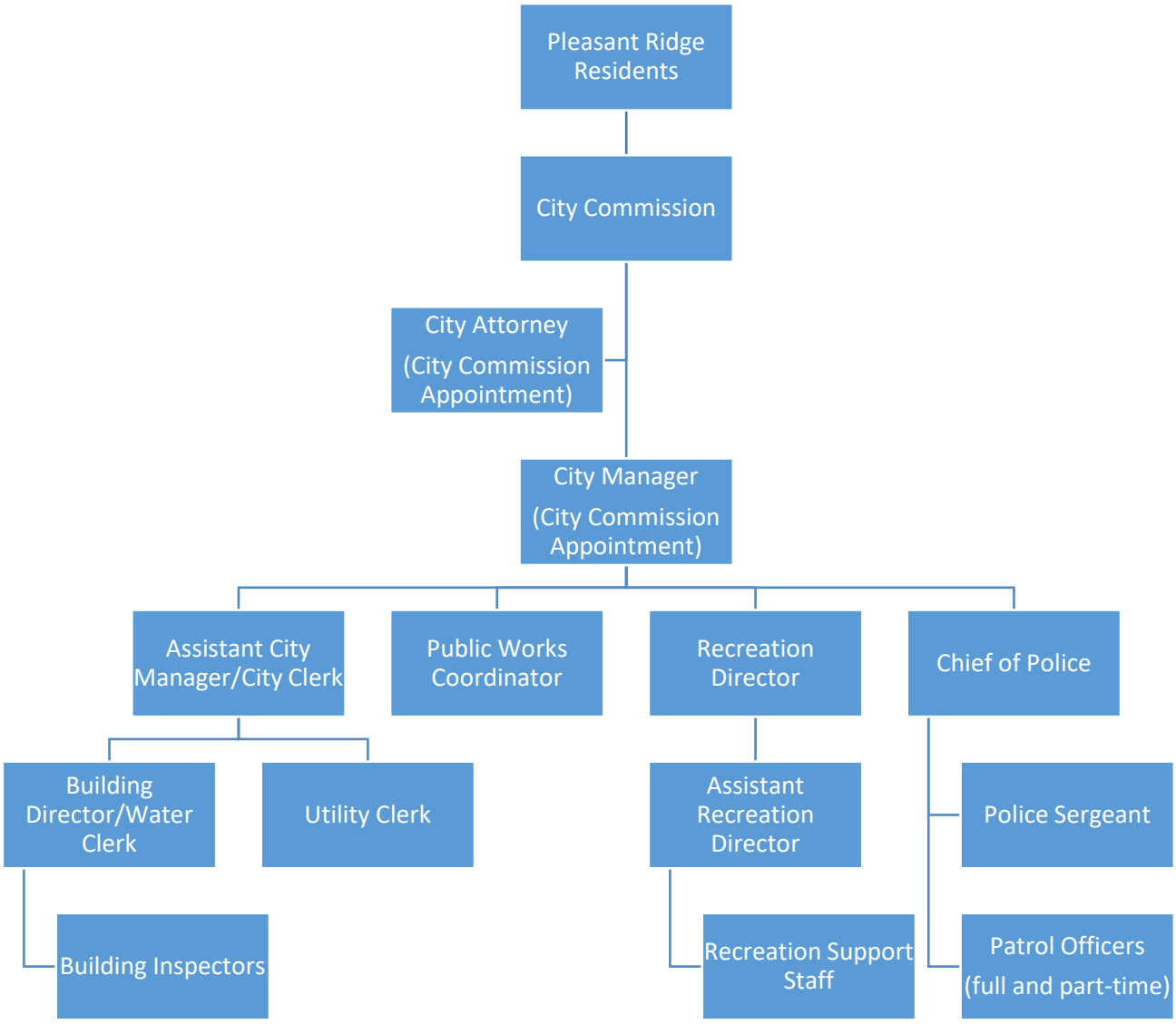
8. Personnel

The City of Pleasant Ridge is a service-oriented organization with a large percentage of expenditures associated with staff salaries and related costs. In addition to part-time and full-time non-union employees, there is one bargaining unit - the Pleasant Ridge Police Officers Association, represented by the Fraternal Order of Police Labor Council.

The City outsources its Fire/EMS, Public Works, Treasury, Assessing, Police and Fire Dispatch, and City Attorney positions.

Position	Status	FY23
City Hall		
City Manager	Full-Time	1.00
City Clerk	Full-Time	1.00
City Treasurer	Part-Time	0.00
Public Works Manager	Full-Time	1.00
Utility/Building Clerk	Full-Time	1.00
Solid Waste Clerk	Part-Time	0.5
City Hall Total		4.5
Police Department		
Chief	Full-Time	1.00
Sergeant	Full-Time	1.00
Patrol Officer	Full-Time	5.00
Patrol Officer (1)	Part-Time	0.20
Office Clerk	Part-Time	0.00
Crossing Guard	Part-Time	0.30
Police Total		7.5
Recreation Department		
Director	Full-Time	1.00
Recreation Assistant	Full-Time	1.00
Building Supervisor	Part-Time	1.00
Playground Supervisor	Seasonal	0.44
Life Guard (senior)	Seasonal	0.44
Life Guard	Seasonal	1.75
Pool Instructors	Seasonal	0.10
Recreation Total		5.73
Full Time Positions		13.00
Part Time Positions (FTE)		4.76
All Departments		17.76

Organization Chart



Not shown in the organization chart are the Charter-established positions of City Treasurer and City Assessor. These positions are outsourced by the City to Plante Moran (City Treasurer) and Oakland County Equalization (Assessor).

C. General Fund

101. Summary

The General Fund functions as the City's operating fund and accounts for taxes and other general revenues and expenditures that are not restricted for other specific purposes. It is the City's policy goal to maintain a minimum 70-80% undesignated General Fund fund balance to maintain cash flow, solvency, and to set aside for unforeseen emergencies or cash shortfalls caused by revenue declines or delays. FY23 budget includes revenues of $3,349,152 and expenditures of $3,314,102 with a projected end of year fund balance percentage of 54%.

REVENUES

SOURCE	Actual 2018-19	Actual 2019-20	Actual 2020-21	Budget 2021-22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Taxes and special assessments	2,137,853	2,268,316	2,401,614	2,461,590	2,548,919	2,628,563	2,710,836
Licenses and Permits	133,085	114,770	110,379	100,300	100,300	100,300	100,300
Federal and State Grants	47,419	49,752	139,801	24,000	24,000	24,000	24,000
State Shared Revenue	266,525	259,190	296,617	256,000	299,674	299,674	299,674
Charges for Services	286,841	219,574	238,526	227,955	232,085	236,922	241,919
Fines and Forfeits	107,920	81,991	76,187	105,000	87,500	87,500	87,500
Interest and Rents	27,166	31,979	8,746	15,000	17,000	17,000	17,000
Other revenue	159,657	115,223	87,846	81,250	79,750	79,750	79,750
Transfers-In	0	0	0	0	0	0	0
REVENUE TOTAL	**3,166,466**	**3,140,795**	**3,359,716**	**3,271,095**	**3,389,227**	**3,473,709**	**3,560,978**

EXPENDITURES

DEPARTMENT							
Mayor and Commission	15,490	24,601	13,769	27,550	27,550	27,550	27,550
City Manager	167,267	179,032	182,942	201,250	215,683	226,511	237,533
Elections	7,442	15,144	21,747	10,760	10,760	10,760	10,760
City Attorney	17,083	18,563	26,633	26,500	26,500	26,500	26,500
City Clerk	103,617	113,876	114,130	119,865	123,840	128,676	133,963
Information Technology	92,627	73,122	74,763	75,250	74,000	74,000	74,000
General Government	152,121	117,728	117,026	158,650	189,950	174,950	176,435
Cable TV	2,400	2,675	3,263	3,410	2,910	2,910	2,910
City Treasurer	113,776	115,605	125,667	115,050	128,300	132,564	136,855
Assessment	21,347	22,530	21,212	22,670	22,670	22,870	23,070
Police Services	1,061,769	1,123,144	1,129,464	1,294,203	1,395,128	1,437,981	1,482,298
Fire/Rescue	256,581	256,581	256,581	256,581	256,581	256,581	256,581
Building Department	75,951	67,619	69,886	79,194	84,991	105,814	106,664
Planning Commission	0	0	0	0	0	0	0
Public Works	262,262	273,689	305,544	291,261	307,918	318,536	329,424
Street Lighting	37,227	43,884	46,006	44,000	46,500	46,500	46,500
Recreation	382,869	375,382	318,877	394,937	333,055	340,148	348,476
Retirement Services	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Transfers Out	180,000	60,000	50,595	100,000	100,000	100,000	100,000
EXPENDITURES TOTAL	**2,954,829**	**2,888,175**	**2,883,105**	**3,226,131**	**3,351,336**	**3,437,851**	**3,524,517**
Revenue over (under) expenditures	211,637	252,620	476,611	44,964	37,891	35,857	36,461
Fund Balance, beginning of the year	768,837	980,449	1,233,027	1,709,638	1,754,602	1,792,493	1,828,351
Fund Balance adjustments		(48)					
Fund Balance, end of the year	980,474	1,233,027	1,709,638	1,754,602	1,792,493	1,828,351	1,864,812
General Fund Balance %	33.18%	42.69%	59.30%	54.39%	53.49%	53.18%	52.91%

101. General Fund Revenues

The General Fund revenues provide funding for City services that have a city-wide benefit. General Fund revenues are categorized as taxes and special assessments, community development permit fees and charges, intergovernmental transfers (state revenue sharing), and other revenues.

Total property tax revenue is projected to grow modestly vs. fiscal year FY22. This modest increase is due to growth in tax revenue of 3.3% as allowed by the Headlee amendment, and as calculated by the state.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
GENERAL FUND REVENUE DETAIL							
Taxes and Special Assessments							
101-000-401.000	Property Taxes - Operating	2,056,823	2,105,487	2,018,463	2,184,380	2,256,465	2,330,928
101-000-401.001	Chargebacks from County	0	0	0	0	0	0
101-000-401.400	Property Taxes - Police Pension Millage	175,062	220,813	215,886	229,087	236,646	244,456
101-000-401.500	Property Taxes - Community Promo	48,714	48,290	46,289	48,452	48,452	48,452
101-000-410.000	Personal Property Taxes	0	0	0	0	0	0
101-000-410.500	Delinquent Tax Collection	18,311	0	481	0	0	0
101-000-445.000	Interest on Taxes	22,647	10,000	6,275	10,000	10,000	10,000
101-000-447.000	Property Tax Admin Fee	80,057	77,000	79,001	77,000	77,000	77,000
	Total taxes and special assessments	*2,401,614*	*2,461,590*	*2,366,395*	*2,548,919*	*2,628,563*	*2,710,836*
Licenses and Permits							
101-000-476.000	Landlord Licenses	1,200	750	800	750	750	750
101-000-477.000	Electrical Permits	10,020	8,250	10,060	8,250	8,250	8,250
101-000-478.000	Building Permits	78,303	75,000	107,923	75,000	75,000	75,000
101-000-479.000	Plumbing and Mechanical Permits	20,740	15,000	13,703	15,000	15,000	15,000
101-000-480.000	Liquor License Fee Revenue	825	800	839	800	800	800
101-000-485.000	Dog Licenses	(709)	500	598	500	500	500
	Total licenses and permits	*110,379*	*100,300*	*133,923*	*100,300*	*100,300*	*100,300*
Federal and State Grants							
101-000-522.000	CDBG	5,989	5,500	4,096	5,500	5,500	5,500
101-000-528.000	Other Federal Grants	94,904	0	0	0	0	0
101-000-530.000	CDBG	0	0	0	0	0	0
101-000-532.000	Local Grants	8,852	0	0	0	0	0
101-000-540.000	State Grant	0	0	0	0	0	0
101-000-544.000	302 Training Funds	725	1,000	417	1,000	1,000	1,000
101-000-573.000	Local Community Stabilization	29,331	17,500	9,476	17,500	17,500	17,500
	Total federal and state grants	*139,801*	*24,000*	*13,989*	*24,000*	*24,000*	*24,000*
State Shared Revenue							
101-000-576.500	Sales Taxes - Statutory	49,383	46,000	25,185	47,500	47,500	47,500
101-000-576.750	Sales Taxes - Constitutional	247,234	210,000	136,015	252,174	252,174	252,174
101-000-576.751	Sales Taxes - Supplemental	0	0	0	0	0	0
	Total state shared revenue	*296,617*	*256,000*	*161,200*	*299,674*	*299,674*	*299,674*
Charges for Services							
101-000-607.000	NSF Fees	330	400	300	400	400	400
101-000-608.000	Registration Fees	3,165	3,000	2,610	3,000	3,000	3,000

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
101-000-609.000	Administrative Fees	11,505	7,500	9,175	7,500	7,500	7,500
101-000-627.000	Administrative Charges	105,707	105,625	105,625	107,562	110,135	112,793
101-000-627.100	Charges for Services - Personnel	12,555	12,755	12,755	13,176	13,611	14,060
101-000-627.200	Charges for Services - IT	52,934	53,675	53,675	55,446	57,276	59,166
101-000-635.000	Copying Charges	401	50	65	50	50	50
101-000-637.000	Zoning Board of Appeals Fees	500	0	0	0	0	0
101-000-641.100	Election Reimbursement	0	0	2,341	0	0	0
101-000-641.200	Spraying Reimbursement	0	0	0	0	0	0
101-000-641.300	Tree Planting Reimbursement	959	750	500	750	750	750
101-000-642.000	Sales	0	0	80	0	0	0
101-000-651.000	Use & Admission Fees	195	1,000	9,898	1,000	1,000	1,000
101-000-651.208	Admission - Dog Park	4,590	3,200	3,745	3,200	3,200	3,200
101-000-653.000	Registration Program Fees	45,685	40,000	94,062	40,000	40,000	40,000
	Total charges for services:	*238,526*	*227,955*	*294,831*	*232,085*	*236,922*	*241,919*
Fines and Forfeits							
101-000-656.000	Municipal Fines	37,487	70,000	77,423	50,000	50,000	50,000
101-000-657.000	District Court Fines	38,700	35,000	35,452	37,500	37,500	37,500
	Total fines and forfeits:	*76,187*	*105,000*	*112,875*	*87,500*	*87,500*	*87,500*
Interest and Rents							
101-000-665.000	Interest & Dividend Income	8,422	5,000	2,755	5,000	5,000	5,000
101-000-667.000	4 Ridge Rental	324	10,000	14,595	12,000	12,000	12,000
101-000-669.000	Investment Gains and Losses	0	0	0	0	0	0
	Total interest and rents:	*8,746*	*15,000*	*17,350*	*17,000*	*17,000*	*17,000*
Other Revenue							
101-000-670.000	Cable Franchise and PEG Fees	55,384	55,000	29,225	55,000	55,000	55,000
101-000-671.000	Miscellaneous Other Revenues	28,312	5,000	42,589	22,500	22,500	22,500
101-000-674.000	Private Contributions and Donations	0	0	0	0	0	0
101-000-675.000	Contributions & Donations	1,000	1,000	0	1,000	1,000	1,000
101-000-679.000	Refunds & Rebates	2,802	20,000	0	1,000	1,000	1,000
101-000-679.300	Refunds & Rebates - Public Safety	348	250	3,597	250	250	250
101-000-681.000	Sidewalk Replacement/residents	0	0	0	0	0	0
101-000-695.000	Other Financing Sources	0	0	0	0	0	0
101-000-696.000	Bond & Insurance Recoveries	0	0	0	0	0	0
	Total other revenue:	*87,846*	*81,250*	*75,411*	*79,750*	*79,750*	*79,750*
Transfers-In							
101-000-699.208	Transfer In - Dog Park	0	0	0	0	0	0
101-000-699.212	Transfers In - Tree Planting	0	0	0	0	0	0
101-000-699.351	Transfers In - Debt Service	0	0	0	0	0	0
	Total transfers-in:	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL REVENUES		**3,359,716**	**3,271,095**	**3,175,974**	**3,389,227**	**3,473,709**	**3,560,978**

101. General Fund Expenditures

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
GENERAL FUND APPROPRIATIONS							
Department 101 - Mayor and Commission							
101-101-715.000	Worker's Compensation	71	50	76	50	50	50
101-101-955.000	Miscellaneous Expenses	7,146	20,000	8,028	20,000	20,000	20,000
101-101-956.000	Conferences and Workshops	195	1,000	130	1,000	1,000	1,000
101-101-958.000	Memberships and Dues	6,357	6,500	7,361	6,500	6,500	6,500
	Totals for Department 101 - Mayor and Commission	*13,769*	*27,550*	*15,595*	*27,550*	*27,550*	*27,550*
Department 172 - City Manager							
101-172-702.000	Administration Wages	107,585	112,000	86,468	125,300	130,939	136,831
101-172-702.250	Comptime Payout	0	0	0	0	0	0
101-172-711.000	Social Security & Medicare	8,913	9,300	7,299	9,607	9,924	10,251
101-172-712.000	Medical Insurance	5,186	6,150	4,087	5,250	5,250	5,250
101-172-712.001	Medical Insurance - Employee Cont.	0	0	0	0	0	0
101-172-712.003	Medical Insurance - Retirees	5,889	6,500	3,665	6,500	6,715	6,936
101-172-712.004	Medical Insurance - Retiree Cont.	(466)	(600)	(466)	(600)	(600)	(600)
101-172-712.006	Medical Insurance - HSA (Retirees)	0	0	0	0	0	0
101-172-713.000	Life Insurance	692	750	599	750	750	750
101-172-714.000	Retirement - DB (Active Employees)	0	0	0	0	0	0
101-172-714.003	Retirement - DB (Retirees)	25,068	34,500	28,480	34,500	38,002	41,374
101-172-714.500	Retirement - DC (Active Employees)	22,171	22,960	18,128	25,687	26,842	28,050
101-172-715.000	Worker's Compensation	87	50	93	50	50	50
101-172-716.000	Unemployment Compensation	16	40	17	40	40	40
101-172-720.000	Tuition, Training and Education	0	100	0	100	100	100
101-172-727.000	Office Supplies	80	0	0	0	0	0
101-172-728.000	Postage	0	0	0	0	0	0
101-172-731.000	Operating Supplies	38	100	0	100	100	100
101-172-790.000	Books & Periodicals	165	400	423	400	400	400
101-172-862.000	Automobile Allowance	6,000	6,000	5,000	6,000	6,000	6,000
101-172-956.000	Conferences and Workshops	520	2,000	250	1,000	1,000	1,000
101-172-958.000	Memberships and Dues	998	1,000	1,581	1,000	1,000	1,000
	Totals for Department 172 - City Manager	*182,942*	*201,250*	*155,624*	*215,683*	*226,511*	*237,533*
Department 191 - Elections							
101-191-704.000	Part-Time Wages	3,960	4,500	1,390	4,500	4,500	4,500
101-191-711.000	Social Security & Medicare	40	0	27	0	0	0
101-191-715.000	Worker's Compensation	19	10	20	10	10	10
101-191-728.000	Postage	3,453	250	600	250	250	250
101-191-731.000	Operating Supplies	6,148	3,000	1,906	3,000	3,000	3,000
101-191-809.000	Contractual Services	0	1,250	0	1,250	1,250	1,250
101-191-900.000	Printing & Publishing	5,794	1,250	49	1,250	1,250	1,250
101-191-970.000	Capital Outlay	2,333	500	0	500	500	500
	Totals for Department 191 - Elections	*21,747*	*10,760*	*3,992*	*10,760*	*10,760*	*10,760*
Department 210 - City Attorney							
101-210-815.000	City Attorney Services	21,502	20,000	9,663	20,000	20,000	20,000

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
101-210-815.250	Court Prosecutions	4,860	6,000	4,793	6,000	6,000	6,000
101-210-815.500	Labor Relations Attorney	271	500	0	500	500	500
	Totals for Department 210 - City Attorney	*26,633*	*26,500*	*14,456*	*26,500*	*26,500*	*26,500*
Department 215 - City Clerk							
101-215-702.000	Administration Wages	86,276	88,330	63,567	92,305	96,459	100,799
101-215-711.000	Social Security & Medicare	6,554	6,760	4,723	6,760	6,983	7,214
101-215-712.000	Medical Insurance	6,740	7,750	6,795	7,750	7,983	8,222
101-215-712.001	Medical Insurance - Employee Cont.	(686)	(775)	(592)	(775)	(798)	(822)
101-215-712.005	Medical Insurance - HSA	1,450	1,500	1,475	1,500	1,500	1,500
101-215-713.000	Life Insurance	592	195	578	195	195	195
101-215-714.000	Retirement - DB (Active Employees)	12,364	13,250	6,602	13,250	13,500	14,000
101-215-715.000	Worker's Compensation	204	125	218	125	125	125
101-215-716.000	Unemployment Compensation	11	30	11	30	30	30
101-215-727.000	Office Supplies	94	0	0	0	0	0
101-215-728.000	Postage	0	0	0	0	0	0
101-215-731.000	Operating Supplies	0	1,250	0	1,250	1,250	1,250
101-215-861.000	Mileage Allowance	265	300	305	300	300	300
101-215-955.000	Miscellaneous Expenses	0	100	0	100	100	100
101-215-956.000	Conferences and Workshops	0	750	0	750	750	750
101-215-958.000	Memberships and Dues	266	300	326	300	300	300
101-215-970.000	Capital Outlay	0	0	0	0	0	0
	Totals for Department 215 - City Clerk	*114,130*	*119,865*	*84,008*	*123,840*	*128,676*	*133,963*
Department 228 - Information Technology							
101-228-809.000	Contractual Services	15,748	22,500	17,487	20,000	20,000	20,000
101-228-851.000	Communications	16,900	18,000	14,705	18,000	18,000	18,000
101-228-928.000	Software Maintenance	14,842	15,500	8,124	15,500	15,500	15,500
101-228-970.000	Capital Outlay	17,282	10,000	6,376	10,000	10,000	10,000
101-228-983.000	Leased Assets	9,991	9,250	10,423	10,500	10,500	10,500
	Totals for Department 228 - Information Technology	*74,763*	*75,250*	*57,115*	*74,000*	*74,000*	*74,000*
Department 248 - General Government							
101-248-727.000	Office Supplies	1,614	2,000	1,377	2,000	2,000	2,000
101-248-728.000	Postage	2,003	3,000	1,316	3,000	3,000	3,000
101-248-731.000	Operating Supplies	8,526	8,500	4,343	8,500	8,500	8,500
101-248-733.000	Janitorial Supplies	259	500	529	500	500	500
101-248-734.000	Building Maintenance Supplies	109	200	0	200	200	200
101-248-803.000	Janitorial Contract	195	250	0	250	250	250
101-248-809.000	Contractual Services	6,707	6,500	5,500	6,500	6,500	6,500
101-248-809.002	Payroll Administration	9,618	10,000	8,656	10,000	10,000	10,000
101-248-814.000	Engineering Services	0	0	0	0	0	0
101-248-851.000	Communications	0	0	0	0	0	0
101-248-880.000	Community Promotion	11,114	17,700	11,636	60,000	45,000	46,485
101-248-900.000	Printing & Publishing	7,267	12,000	5,541	12,000	12,000	12,000
101-248-910.000	Insurance & Bonds	49,751	60,000	47,640	60,000	60,000	60,000
101-248-920.000	Public Utilities	10,397	10,000	8,599	10,000	10,000	10,000
101-248-929.000	Equipment Maintenance	89	500	86	500	500	500
101-248-931.000	Building Maintenance	7,706	25,000	32,391	15,000	15,000	15,000
101-248-955.000	Miscellaneous Expenses	1,671	2,500	111	1,500	1,500	1,500
101-248-970.000	Capital Outlay	0	0	0	0	0	0

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
101-248-983.000	Leased Assets	0	0	0	0	0	0
	Totals for Department 248 - General Government	*117,026*	*158,650*	*127,725*	*189,950*	*174,950*	*176,435*
Department 249 - Cable TV							
101-249-715.000	Worker's Compensation	13	10	0	10	10	10
101-249-731.000	Operating Supplies	0	500	0	250	250	250
101-249-809.000	Contractual Services	3,250	2,400	2,395	2,400	2,400	2,400
101-249-958.000	Memberships and Dues	0	500	0	250	250	250
	Totals for Department 249 - Cable TV	*3,263*	*3,410*	*2,395*	*2,910*	*2,910*	*2,910*
Department 253 - City Treasurer							
101-253-714.003	Retirement - DB (Retirees)	24,728	16,000	13,203	16,000	17,624	19,188
101-253-715.000	Worker's Compensation	0	0	0	0	0	0
101-253-728.000	Postage	0	0	0	0	0	0
101-253-801.000	Audit Contract	21,850	25,000	24,550	25,000	25,000	25,000
101-253-809.001	Accounting Services	69,084	69,250	51,704	80,000	82,640	85,367
101-253-890.000	Service Charges	9,541	4,500	6,816	7,000	7,000	7,000
101-253-905.000	Printing Checks	0	0	0	0	0	0
101-253-928.000	Software Maintenance	0	0	0	0	0	0
101-253-954.000	Overage/shortage	0	50	0	50	50	50
101-253-955.000	Miscellaneous Expenses	344	200	187	200	200	200
101-253-960.100	Credit Card Service Charge	120	50	80	50	50	50
	Totals for Department 253 - City Treasurer	*125,667*	*115,050*	*96,540*	*128,300*	*132,564*	*136,855*
Department 254 - Assessing							
101-254-702.000	Administration Wages	900	1,050	720	1,050	1,050	1,050
101-254-711.000	Social Security & Medicare	69	100	55	100	100	100
101-254-804.000	County Assessor Fees	19,231	19,700	0	19,700	19,900	20,100
101-254-901.000	Printing Tax Bills	1,012	1,800	1,069	1,800	1,800	1,800
101-254-956.000	Conferences and Workshops	0	20	0	20	20	20
	Totals for Department 254 - Assessment	*21,212*	*22,670*	*1,844*	*22,670*	*22,870*	*23,070*
Department 301 - Police Services							
101-301-702.000	Administration Wages	87,359	89,709	69,286	93,746	97,964	102,373
101-301-702.250	Comptime Payout	0	0	0	0	0	0
101-301-703.000	Overtime	23,032	17,500	25,448	17,500	17,500	17,500
101-301-704.000	Part-Time Wages	13,199	10,000	7,233	10,000	10,000	10,000
101-301-705.000	Full Time Wages	344,290	431,850	322,378	462,100	477,349	493,102
101-301-708.000	Crossing Guard Wages	1,738	3,800	1,775	3,800	3,925	4,055
101-301-711.000	Social Security & Medicare	25,820	28,000	23,765	28,000	28,000	28,000
101-301-712.000	Medical Insurance	75,665	87,000	80,242	90,000	92,970	96,038
101-301-712.001	Medical Insurance - Employee Cont.	(6,984)	(5,950)	(6,644)	(7,500)	(7,500)	(7,500)
101-301-712.002	Retirement - HCSP	6,729	6,300	7,168	6,750	6,973	7,203
101-301-712.003	Medical Insurance - Retirees	100,835	82,500	66,727	87,500	90,388	93,370
101-301-712.004	Medical Insurance - Retiree Cont.	(11,242)	(6,600)	(13,686)	(14,500)	(14,500)	(14,500)
101-301-712.005	Medical Insurance - HSA	13,352	12,100	12,567	15,000	15,000	15,000
101-301-712.006	Medical Insurance - HSA (Retirees)	5,075	5,500	5,075	5,500	5,500	5,500
101-301-713.000	Life Insurance	3,260	3,700	3,440	3,500	3,616	3,735
101-301-714.000	Retirement - DB (Active Employees)	71,871	62,500	77,427	95,000	98,135	101,373
101-301-714.001	Retirement - Employee Contribution	0	0	0	0	0	0
101-301-714.003	Retirement - DB (Retirees)	224,252	293,000	227,325	315,000	325,395	336,133

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
101-301-714.500	Retirement - DC (Active Employees)	5,685	15,000	6,730	15,000	15,495	16,006
101-301-715.000	Worker's Compensation	9,691	6,500	10,338	9,700	9,700	9,700
101-301-716.000	Unemployment Compensation	58	200	62	200	200	200
101-301-717.000	Longevity	0	0	0	0	0	0
101-301-718.000	Uniform Allowance	8,070	7,350	4,435	7,350	7,350	7,350
101-301-718.100	Uniform Cleaning Allowance	3,300	4,000	3,900	4,000	4,000	4,000
101-301-718.200	Firearm Allowance	0	0	0	0	0	0
101-301-720.000	Tuition, Training and Education	1,560	5,000	2,097	5,000	5,000	5,000
101-301-720.500	302 Training Funds	0	650	0	650	650	650
101-301-727.000	Office Supplies	927	1,500	883	1,500	1,500	1,500
101-301-728.000	Postage	0	0	0	0	0	0
101-301-731.000	Operating Supplies	22,757	17,500	14,276	19,000	19,000	19,000
101-301-751.000	Gas & Oil	16,164	17,500	18,545	22,500	23,243	24,010
101-301-790.000	Books & Periodicals	0	0	0	0	0	0
101-301-803.000	Janitorial Contract	292	500	0	500	500	500
101-301-809.000	Contractual Services	14,371	15,000	0	15,000	15,000	15,000
101-301-809.200	Clemis/LEIN Services	10,761	12,000	8,460	12,500	12,875	13,261
101-301-809.911	Dispatch Contract	39,000	41,350	29,250	41,350	42,715	44,124
101-301-827.200	Charges for Services - IT	5,615	5,694	5,694	5,882	6,076	6,277
101-301-851.000	Communications	0	0	0	0	0	0
101-301-852.000	Radio Maintenance	0	0	0	0	0	0
101-301-929.000	Equipment Maintenance	398	1,500	367	1,000	1,000	1,000
101-301-930.000	Vehicle Maintenance	7,511	10,000	9,017	10,000	10,000	10,000
101-301-955.000	Miscellaneous Expenses	178	500	51	500	500	500
101-301-956.000	Conferences and Workshops	0	1,250	599	750	750	750
101-301-958.000	Memberships and Dues	365	300	250	350	350	350
101-301-970.000	Capital Outlay	4,510	10,000	15,726	11,000	11,363	11,738
101-301-995.100	Interest: Governmental Debt	0	0	0	0	0	0
	Totals for Department 301 - Police Services	*1,129,464*	*1,294,203*	*1,040,206*	*1,395,128*	*1,437,981*	*1,482,298*
Department 339 - Fire/Rescue							
101-339-802.000	Fire Services Contract	256,581	256,581	235,199	256,581	256,581	256,581
	Totals for Department 339 - Fire/Rescue	*256,581*	*256,581*	*235,199*	*256,581*	*256,581*	*256,581*
Department 371 - Community Development							
101-371-704.000	Part-Time Wages	6,686	7,200	5,284	7,200	7,200	7,200
101-371-711.000	Social Security & Medicare	511	550	404	550	550	550
101-371-715.000	Worker's Compensation	26	50	28	50	50	50
101-371-727.000	Office Supplies	0	0	0	0	0	0
101-371-728.000	Postage	0	0	0	0	0	0
101-371-731.000	Operating Supplies	0	0	9	0	0	0
101-371-809.000	Contractual Services	10,729	13,500	6,886	20,000	40,000	40,000
101-371-811.000	Electrical Inspector Fees	5,550	7,000	3,488	5,500	5,500	5,500
101-371-812.000	Mechanical Inspector Fees	7,163	8,000	5,625	8,000	8,000	8,000
101-371-813.000	Building Inspector Fees	15,300	18,000	13,331	18,000	18,000	18,000
101-371-827.100	Charges for Services - Personnel	12,555	12,755	12,755	13,176	13,611	14,060
101-371-827.200	Charges for Services - IT	11,232	11,389	11,389	11,765	12,153	12,554
101-371-955.000	Miscellaneous Expenses	134	750	0	750	750	750
101-371-970.000	Capital Outlay	0	0	0	0	0	0
	Totals for Department 371 - Community Development	*69,886*	*79,194*	*59,199*	*84,991*	*105,814*	*106,664*

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Department 400 - Planning Commission							
101-400-809.000	Contractual Services	0	0	0	0	0	0
101-400-958.000	Memberships and Dues	0	0	0	0	0	0
	Totals for Department 400 - Planning Commission	*0*	*0*	*0*	*0*	*0*	*0*
Department 440 - Public Works							
101-440-702.000	Administration Wages	26,612	30,172	23,194	31,530	32,949	34,431
101-440-711.000	Social Security & Medicare	1,826	1,775	1,604	1,775	1,834	1,894
101-440-712.000	Medical Insurance	11,915	12,100	11,783	12,499	12,999	13,519
101-440-712.001	Medical Insurance - Employee Cont.	(1,209)	(1,210)	(1,040)	(1,250)	(1,300)	(1,352)
101-440-712.002	Retirement - HCSP	0	0	0	0	0	0
101-440-712.003	Medical Insurance - Retirees	2,945	3,500	1,830	3,000	3,090	3,183
101-440-712.004	Medical Insurance - Retiree Cont.	(233)	0	(233)	(200)	(200)	(200)
101-440-712.005	Medical Insurance - HSA	1,450	950	1,450	1,900	1,900	1,900
101-440-713.000	Life Insurance	249	200	327	200	200	200
101-440-714.000	Retirement - DB (Active Employees)	0	0	0	0	0	0
101-440-714.003	Retirement - DB (Retirees)	14,850	13,000	15,035	14,500	15,972	17,389
101-440-714.500	Retirement - DC (Active Employees)	3,795	4,224	3,206	4,414	4,613	4,820
101-440-715.000	Worker's Compensation	0	0	14	0	0	0
101-440-716.000	Unemployment Compensation	0	0	0	0	0	0
101-440-731.000	Operating Supplies	6,425	5,000	6,321	6,500	6,500	6,500
101-440-809.000	Contractual Services	0	0	0	0	0	0
101-440-809.110	Contractual Services	0	0	0	0	0	0
101-440-809.130	Contractual Services - Parks	0	0	0	0	0	0
101-440-809.140	Contractual Services - Facilities	0	0	0	0	0	0
101-440-810.000	Public Works Contract	195,998	200,000	94,315	210,000	216,930	224,089
101-440-920.000	Public Utilities	4,570	3,000	4,007	4,500	4,500	4,500
101-440-931.000	Building Maintenance	0	0	5,375	0	0	0
101-440-955.000	Miscellaneous Expenses	105	1,000	629	1,000	1,000	1,000
101-440-958.000	Memberships and Dues	0	50	20	50	50	50
101-440-970.000	Capital Outlay	36,246	17,500	3,663	17,500	17,500	17,500
	Totals for Department 440 - Public Works	*305,544*	*291,261*	*171,500*	*307,918*	*318,536*	*329,424*
Department 448 - Street Lighting							
101-448-921.000	Streetlighting	46,006	44,000	37,956	46,500	46,500	46,500
	Totals for Department 448 - Street Lighting	*46,006*	*44,000*	*37,956*	*46,500*	*46,500*	*46,500*

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Department 750 - Recreation							
101-750-702.000	Administration Wages	112,698	114,546	93,416	99,775	104,265	108,957
101-750-704.000	Part-Time Wages	8,896	30,000	16,279	30,000	30,990	32,013
101-750-711.000	Social Security & Medicare	9,285	11,000	8,519	10,000	10,330	10,671
101-750-712.000	Medical Insurance	15,910	16,500	15,722	17,045	17,726	18,435
101-750-712.001	Medical Insurance - Employee Cont.	(1,622)	(1,250)	(1,369)	(1,250)	(1,250)	(1,250)
101-750-712.002	Retirement - HCSP	3,369	2,250	2,840	2,250	2,250	2,250
101-750-712.003	Medical Insurance - Retirees	0	0	0	0	0	0
101-750-712.004	Medical Insurance - Retiree Cont.	0	0	0	0	0	0
101-750-712.005	Medical Insurance - HSA	4,350	4,500	4,375	4,500	4,500	4,500
101-750-713.000	Life Insurance	999	350	1,010	1,000	1,000	1,000
101-750-714.000	Retirement - DB (Active Employees)	16,215	12,500	10,133	12,913	14,223	15,485

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
101-750-714.001	Retirement - Employee Contribution	0	0	0	0	0	0
101-750-714.003	Retirement - DB (Retirees)	11,334	10,000	6,602	10,000	10,000	10,000
101-750-714.500	Retirement - DC (Active Employees)	38	0	(38)	0	0	0
101-750-715.000	Worker's Compensation	3,461	4,000	3,692	4,000	4,000	4,000
101-750-716.000	Unemployment Compensation	15	50	16	50	50	50
101-750-720.000	Tuition, Training and Education	0	750	0	750	750	750
101-750-727.000	Office Supplies	295	2,000	1,027	2,000	2,000	2,000
101-750-728.000	Postage	0	0	0	0	0	0
101-750-728.500	Newsletter Delivery	814	750	1,463	750	750	750
101-750-729.000	Recreation Program Supplies	6	7,500	537	2,500	2,500	2,500
101-750-730.000	Special Program Supplies	4,760	25,000	27,389	25,000	25,000	25,000
101-750-731.000	Operating Supplies	3,627	5,000	7,422	5,000	4,000	4,000
101-750-733.000	Janitorial Supplies	892	0	1,255	0	0	0
101-750-734.000	Building Maintenance Supplies	0	0	0	0	0	0
101-750-736.000	Computer Supplies	0	0	0	0	0	0
101-750-790.000	Books & Periodicals	0	0	0	0	0	0
101-750-803.000	Janitorial Contract	2,846	12,100	7,982	12,100	12,100	12,100
101-750-803.700	Exterminator Service	612	600	672	600	600	600
101-750-809.000	Contractual Services	10,333	28,000	13,826	22,500	22,500	22,500
101-750-809.700	Alarm System	0	0	0	0	0	0
101-750-827.200	Charges for Services - IT	8,423	8,541	8,541	8,823	9,114	9,415
101-750-851.000	Communications	0	0	0	0	0	0
101-750-861.000	Mileage Allowance	0	500	0	500	500	500
101-750-883.000	Sports	3,717	7,500	7,795	7,000	7,000	7,000
101-750-884.000	Spring & Summer Sports	0	0	0	0	0	0
101-750-890.000	Service Charges	484	0	338	0	0	0
101-750-904.000	Printing Newsletter	0	0	0	0	0	0
101-750-920.000	Public Utilities	25,480	25,000	25,089	25,000	25,000	25,000
101-750-929.000	Equipment Maintenance	215	2,500	416	500	500	500
101-750-931.000	Building Maintenance	10,152	15,000	7,231	15,000	15,000	15,000
101-750-934.000	Parks Maintenance	16,094	12,500	11,775	12,500	12,500	12,500
101-750-955.000	Miscellaneous Expenses	0	0	0	0	0	0
101-750-955.300	Transportation	0	0	0	0	0	0
101-750-956.000	Conferences and Workshops	0	1,500	0	1,500	1,500	1,500
101-750-958.000	Memberships and Dues	0	750	0	750	750	750
101-750-961.000	Misc Program Supplies	0	0	0	0	0	0
101-750-970.000	Capital Outlay	45,179	35,000	2,000	0	0	0
	Totals for Department 750 - Recreation	*318,877*	*394,937*	*285,955*	*333,055*	*340,148*	*348,476*
Department 863 - Retirement Services							
101-863-712.000	Medical Insurance	0	0	0	0	0	0
101-863-712.001	Medical Insurance - Employee Cont.	0	0	0	0	0	0
101-863-714.000	Retirement - DB (Active Employees)	0	0	0	0	0	0
101-863-714.002	OPEB Trust Contributions	5,000	5,000	5,000	5,000	5,000	5,000
	Totals for Department 863 - Retirement Services	*5,000*	*5,000*	*5,000*	*5,000*	*5,000*	*5,000*
Department 966 - Transfers Out							
101-966-999.218	Transfers Out - Infrastructure	0	0	0	0	0	0
101-966-999.251	Transfers Out - Pool Operating	0	0	0	0	0	0
101-966-999.259	Transfers Out - SCAF-RF	0	0	0	0	0	0
101-966-999.351	Transfers Out - Debt Service	0	0	0	0	0	0
101-966-999.401	Transfers Out - Capital Improvement	50,000	100,000	100,000	100,000	100,000	100,000

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
101-966-999.701	Transfers Out - Tax Fund	595	0	0	0	0	0
	Totals for Department 966 - Transfers Out	*50,595*	*100,000*	*100,000*	*100,000*	*100,000*	*100,000*
TOTAL APPROPRIATIONS		**2,883,105**	**3,226,131**	**2,494,309**	**3,351,336**	**3,437,851**	**3,524,517**
NET OF REVENUES/APPROPRIATIONS - FUND 101		476,611	44,964	681,665	37,891	35,857	36,461
BEGINNING FUND BALANCE		1,233,027	1,709,638	1,709,638	1,754,602	1,792,493	1,828,351
FUND BALANCE ADJUSTMENTS		0	0	0	0	0	0
ENDING FUND BALANCE		1,709,638	1,754,602	2,391,303	1,792,493	1,828,351	1,864,812

D. Special Revenue Funds

202. Major Street Fund

Fund 202 provides for the maintenance of major streets. Major activities include the maintenance and repair of traffic directional signage, pothole patching and other ongoing maintenance, street sweeping, and winter snow and ice removal.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
FUND 202 - MAJOR STREET FUND							
REVENUES							
202-000-579.000	Act 51 Gas Tax Funding	207,209	185,000	131,674	228,594	234,930	238,125
202-000-579.750	Extra Public Act Funding	0	0	0	0	0	0
202-000-665.000	Interest & Dividend Income	44	50	135	50	50	50
TOTAL REVENUES		**207,253**	**185,050**	**131,809**	**228,644**	**234,980**	**238,175**
APPROPRIATIONS							
Department 463 - Street Maintenance							
202-463-731.000	Operating Supplies	48	1,000	0	500	500	500
202-463-809.000	Contractual Services	0	0	0	0	0	0
202-463-810.000	Public Works Contract	16,292	27,500	8,020	30,000	32,500	35,000
202-463-827.000	Administrative Service Charge	0	0	0	0	0	0
202-463-890.000	Service Charges	0	0	0	0	0	0
202-463-955.000	Miscellaneous Expenses	0	0	0	0	0	0
	Totals for Department 463 - Street Maintenance	*16,340*	*28,500*	*8,020*	*30,500*	*33,000*	*35,500*
Department 474 - Traffic Services							
202-474-731.000	Operating Supplies	4,526	2,500	1,160	2,500	2,500	2,500
202-474-810.000	Public Works Contract	39	1,500	0	1,000	1,000	1,000
202-474-935.000	Traffic Control	3,462	6,500	1,004	40,000	5,000	5,000
	Totals for Department 474 - Traffic Services	*8,027*	*10,500*	*2,164*	*43,500*	*8,500*	*8,500*
Department 478 - Winter Services							
202-478-731.000	Operating Supplies	9,751	12,500	10,200	12,500	12,500	12,500
202-478-810.000	Public Works Contract	32,705	25,000	30,994	32,500	32,500	32,500
	Totals for Department 478 - Winter Services	*42,456*	*37,500*	*41,194*	*45,000*	*45,000*	*45,000*
Department 910 - Capital Assets							
202-910-970.446	Capital Outlay - Streets & Alleys	58,820	60,000	16,169	140,000	62,500	65,000
	Totals for Department 910 - Capital Assets	58,820	60,000	16,169	140,000	*62,500*	65,000
Department 920 - Administration							
202-920-827.000	Administrative Service Charges	11,500	11,500	11,500	11,500	11,500	11,500
202-920-890.000	Service Charges	618	500	273	500	500	500
202-920-955.000	Miscellaneous Expenses	3,631	2,000	0	2,000	2,000	2,000
	Totals for Department 920 - Administration	*15,749*	*14,000*	*11,773*	*14,000*	*14,000*	*14,000*
Department 966 - Transfers Out							
202-966-999.203	Transfers Out - Local Streets	45,000	45,000	45,000	0	70,479	71,438

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
202-966-999.401	Transfers Out - Capital Improvement	0	0	0	0	0	0
	Totals for Department 966 - Transfers Out	*45,000*	*45,000*	*45,000*	*0*	*70,479*	*71,438*
TOTAL APPROPRIATIONS		**186,392**	**195,500**	**124,320**	**273,000**	**233,479**	**239,438**
NET OF REVENUES/APPROPRIATIONS - FUND 202		20,861	(10,450)	7,489	(44,356)	1,501	(1,263)
BEGINNING FUND BALANCE		119,222	140,083	140,083	129,633	85,277	86,778
ENDING FUND BALANCE		140,083	129,633	147,572	85,277	86,778	85,515

203. Local Street Fund

Fund 203 provides for the maintenance of local streets. Major activities include the maintenance and repair of traffic directional signage, pothole patching and other ongoing maintenance, street sweeping, and winter snow and ice removal.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 203 - LOCAL STREET FUND							
REVENUES							
203-000-569.000	State Grants	0	0	9,497	0	0	0
203-000-574.048	METRO Act	9,292	7,500	0	7,500	7,500	7,500
203-000-579.000	Act 51 Gas Tax Funding	70,618	63,000	44,842	76,198	78,310	79,375
203-000-665.000	Interest & Dividend Income	4	40	2	40	40	40
203-000-679.000	Refunds & Rebates	0	0	0	0	0	0
203-000-699.202	Transfers In - Major Streets	45,000	45,000	45,000	0	70,479	71,438
TOTAL REVENUES		**124,914**	**115,540**	**99,341**	**83,738**	**156,329**	**158,353**
APPROPRIATIONS							
Department 463 - Street Maintenance							
203-463-731.000	Operating Supplies	72	500	0	500	500	500
203-463-809.000	Contractual Services	0	0	0	0	0	0
203-463-810.000	Public Works Contract	26,639	25,000	48,400	30,000	30,000	30,000
203-463-814.000	Engineering Services	0	0	0	0	0	0
203-463-827.000	Administrative Service Charge	0	0	0	0	0	0
203-463-890.000	Service Charges	0	0	0	0	0	0
203-463-955.000	Miscellaneous Expenses	0	0	0	0	0	0
	Totals for Department 463 - Street Maintenance	26,711	25,500	48,400	30,500	30,500	30,500
Department 474 - Traffic Services							
203-474-731.000	Operating Supplies	7,303	4,000	1,740	4,000	4,000	4,000
203-474-810.000	Public Works Contract	0	1,000	0	1,000	1,000	1,000
	Totals for Department 474 - Traffic Services	7,303	5,000	1,740	5,000	5,000	5,000
Department 478 - Winter Services							
203-478-731.000	Operating Supplies	10,037	12,500	8,455	12,500	12,500	12,500
203-478-810.000	Public Works Contract	49,057	27,500	46,490	45,000	32,500	35,000
	Totals for Department 478 - Winter Services	59,094	40,000	54,945	57,500	45,000	47,500
Department 910 - Capital Assets							
203-910-970.446	Capital Outlay - Streets & Alleys	57,133	40,000	10,057	0	62,500	65,000
	Totals for Department 910 - Capital Assets	57,133	40,000	10,057	0	62,500	65,000
Department 920 - Administration							
203-920-814.000	Engineering Services	420	1,000	0	1,000	1,000	1,000
203-920-827.000	Administrative Service Charges	3,900	3,900	3,900	3,900	3,900	3,900
203-920-890.000	Service Charges	694	300	388	300	300	300
203-920-955.000	Miscellaneous Expenses	0	1,000	0	1,000	1,000	1,000
	Totals for Department 920 - Administration	5,014	6,200	4,288	6,200	6,200	6,200
Department 966 - Transfers Out							

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
203-966-999.218	Transfers Out - Infrastructure	0	0	0	0	0	0
	Totals for Department 910 - Transfers Out	0	0	0	0	0	0
TOTAL APPROPRIATIONS		**155,255**	**116,700**	**119,430**	**99,200**	**149,200**	**154,200**
NET OF REVENUES/APPROPRIATIONS - FUND 203		(30,341)	(1,160)	(20,089)	(15,462)	7,129	4,153
BEGINNING FUND BALANCE		94,660	64,319	64,319	63,159	47,697	54,826
ENDING FUND BALANCE		64,319	63,159	44,230	47,697	54,826	58,978

218. Infrastructure Improvements

Fund 218 provides for the City's infrastructure improvement program, consisting primarily of road reconstruction projects. The program is funded by a 20-year infrastructure improvement approved by the voters in 2014 as a renewal of an earlier 20-year millage. The City sold bonds with a face value of $3,000,000 in April of 2017 to provide funding for the completion of the street reconstruction program in 2017 and 2018. The term of the bond is 15 years, and it is being repaid using the annual infrastructure millage funds.

Together with the DDA Fund 260, Fund 218 is funding the local match for the Woodward streetscape project in FY23. The DDA will repay Fund 218 for this expense over the coming years.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 218 - INFRASTRUCTURE IMPROVEMENTS							
ESTIMATED REVENUES							
218-000-406.000	Infrastructure Taxes	429,833	440,000	421,810	456,486	471,550	487,112
218-000-406.500	Parks Improvement Taxes	0	0	0	0	0	0
218-000-532.000	Local Grants	0	0	0	0	0	0
218-000-569.000	State Grants	9,293	0	6,706	0	0	0
218-000-573.000	Local Community Stabilization	2,144	2,000	1,770	2,000	2,000	2,000
218-000-665.000	Interest & Dividend Income	7,361	5,000	2,396	5,000	5,000	5,000
218-000-675.000	Contributions & Donations	0	0	0	0	0	0
218-000-679.000	Refunds & Rebates	2,398	0	0	0	0	0
218-000-698.000	Bond/Note Issuance @ Face Value	0	0	0	0	0	0
218-000-699.101	Transfers In - General Fund	0	0	0	0	0	0
218-000-699.203	Transfers In - Local Roads	0	0	0	0	0	0
218-000-699.259	Transfers In - SCAF	0	0	0	0	0	0
218-000-699.260	Transfers In - DDA	0	0	0	250,000	75,000	75,000
TOTAL REVENUES		**451,029**	**447,000**	**432,682**	**713,486**	**553,550**	**569,112**
APPROPRIATIONS							
Department 905 - Long-Term Debt Retirement							
218-905-816.000	Paying Agent Fees	500	1,000	500	1,000	1,000	1,000
218-905-816.001	Bond Issuance Costs	0	0	0	0	0	0
218-905-991.044	Principal: 2017 Street Bonds	160,000	170,000	170,000	175,000	185,000	190,000
218-905-995.044	Interest: 2017 Street Bonds	78,450	73,500	73,500	68,325	62,925	57,300
	Totals for department 910 - Long-Term Debt Retirement	*238,950*	*244,500*	*244,000*	*244,325*	*248,925*	*248,300*
Department 910 - Capital Outlay							
218-910-970.003	Capital Outlay - Facilities	0	24,000	23,865	0	0	0
218-910-970.446	Capital Outlay - Streets & Alleys	31,221	100,000	0	750,000	150,000	150,000
218-910-970.750	Capital Outlay - Recreation	92,590	0	0	0	0	0
	Totals for department 910 - Capital Outlay	*123,811*	*124,000*	*23,865*	*750,000*	*150,000*	*150,000*
Department 920 - Service Charges							
218-920-890.000	Service Charges	1,014	0	998	1,000	1,000	1,000
	Totals for department 910 - Capital Outlay	*1,014*	*0*	*998*	*1,000*	*1,000*	*1,000*

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Department 966 - Transfers Out							
218-966-999.259	Transfers Out - SCAF-RF	0	0	0	0	0	0
218-966-999.401	Transfers Out - Capital Improvement	0	0	0	0	0	0
218-966-999.592	Transfers Out - Water and Sewer Fund	0	0	0	50,000	0	150,000
	Totals for department 966 - Transfers Out	*0*	*0*	*0*	*50,000*	*0*	*150,000*
TOTAL APPROPRIATIONS		**363,775**	**368,500**	**268,863**	**1,045,325**	**399,925**	**549,300**
NET OF REVENUES/APPROPRIATIONS - FUND 218		87,254	78,500	163,819	(331,839)	153,625	19,812
BEGINNING FUND BALANCE		715,969	803,223	803,223	881,723	549,884	703,510
ENDING FUND BALANCE		803,223	881,723	967,042	549,884	703,510	723,322

226. Solid Waste Fund

Fund 226 provides for the collection and disposal of all solid waste, recycling services, and brush pickup/removal.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 226 - SOLID WASTE FUND							
ESTIMATED REVENUES							
226-000-403.000	Refuse Collection Taxes	245,449	249,684	240,872	260,670	269,272	278,158
226-000-531.000	Federal Grants	0	0	0	0	0	0
226-000-573.000	Local Community Stabilization	1,224	1,000	1,011	1,000	1,000	1,000
226-000-630.000	Service Charges	167,167	165,585	114,249	175,850	181,653	187,648
226-000-642.000	Sales	839	300	80	300	300	300
226-000-662.000	Utility Bill Penalties	0	2,000	2,310	2,000	2,000	2,000
226-000-665.000	Interest & Dividend Income	2	30	2	30	30	30
TOTAL REVENUES		**414,681**	**418,599**	**358,524**	**439,850**	**454,255**	**469,136**
APPROPRIATIONS							
Department 248 - General Government							
226-248-702.000	Administration Wages	33,167	35,070	29,545	39,050	40,807	42,644
226-248-704.000	Part-Time Wages	0	3,200	0	6,000	6,200	6,500
226-248-711.000	Social Security & Medicare	2,414	2,400	2,161	2,400	2,479	2,561
226-248-712.000	Medical Insurance	6,223	5,750	6,347	7,000	7,140	7,283
226-248-712.001	Medical Insurance - Employee Cont.	(642)	0	(547)	(600)	(600)	(600)
226-248-712.002	Retirement - HCSP	724	500	670	500	500	500
226-248-712.003	Medical Insurance - Retirees	883	1,000	549	1,000	1,000	1,000
226-248-712.004	Medical Insurance - Retiree Cont.	(70)	0	(70)	0	0	0
226-248-712.005	Medical Insurance - HSA	1,160	1,000	1,173	1,000	1,000	1,000
226-248-713.000	Life Insurance	301	250	315	250	250	250
226-248-714.000	Retirement - DB (Active Employees)	587	500	840	750	750	750
226-248-714.001	Retirement - Employee Contribution	0	0	0	0	0	0
226-248-714.003	Retirement - DB (Retirees)	0	0	0	0	0	0
226-248-714.500	Retirement - DC (Active Employees)	1,129	1,100	971	1,100	1,150	1,200
226-248-715.000	Worker's Compensation	300	250	242	250	250	250
226-248-716.000	Unemployment Compensation	6	25	6	25	25	25
226-248-890.000	Service Charges	525	500	375	500	500	500
	Totals for department 248 - General Government	*46,707*	*51,545*	*42,577*	*59,225*	*61,451*	*63,862*
Department 528 - Refuse Collection & Disposal							
226-528-805.000	Refuse Collections Contract	219,084	232,948	176,923	241,101	249,058	257,276
226-528-806.250	Special Household Waste Prog	3,387	2,500	2,167	2,500	2,500	2,500
226-528-810.000	Public Works Contract	45,507	40,000	33,799	45,000	46,500	48,000
226-528-810.001	Leaf Collection	55,688	62,500	64,848	65,000	66,500	68,000
226-528-810.100	Street Sweeping	10,630	10,000	6,950	0	0	0
226-528-827.000	Administrative Service Charge	16,175	16,401	16,401	16,942	17,501	18,079
226-528-827.200	Charges for Services - IT	8,008	8,120	8,120	8,388	8,665	8,951
	Totals for department 528 - Refuse Collection & Disposal	*358,479*	*372,469*	*309,208*	*378,931*	*390,724*	*402,806*
TOTAL APPROPRIATIONS		**405,186**	**424,014**	**351,785**	**438,156**	**452,175**	**466,668**

Account Number Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
NET OF REVENUES/APPROPRIATIONS - FUND 226	9,495	(5,415)	6,739	1,694	2,080	2,467
BEGINNING FUND BALANCE	37,003	46,498	46,498	41,083	42,777	44,857
ENDING FUND BALANCE	46,498	41,083	53,237	42,777	44,857	47,324

251. Pool/Fitness Facility

Fund 251 provides for the operation and maintenance of the community pool and wellness center. Most revenues are provided by a 25-year operating millage approved by the voters in 2003.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 251 - POOL/FITNESS FACILITY							
ESTIMATED REVENUES							
251-000-408.000	Pool Operating Taxes	182,230	186,536	179,070	193,520	199,906	206,503
251-000-573.000	Local Community Stabilization	909	1,000	750	900	900	900
251-000-636.100	Pool Visitor Fees	1,614	500	271	500	500	500
251-000-636.200	Swimming Lesson Fees	5,055	4,000	1,755	4,000	4,000	4,000
251-000-636.300	Swim Team Fees	34,452	37,500	54,969	37,500	38,738	40,016
251-000-636.400	Synchronized Swimming Fees	0	0	0	0	0	0
251-000-665.000	Interest & Dividend Income	6	20	63	20	20	20
251-000-671.000	Miscellaneous Other Revenues	190	0	25	0	0	0
251-000-698.000	Bond/Note Issuance @ Face Value	0	0	0	0	0	0
251-000-699.101	Transfers In - General Fund	0	0	0	0	0	0
251-000-699.258	Transfers In - SCAF-PSRF	0	0	0	0	0	0
251-000-699.259	Transfers In - SCAF	0	0	0	0	0	0
TOTAL REVENUES		**224,456**	**229,556**	**236,903**	**236,440**	**244,063**	**251,938**
APPROPRIATIONS							
Department 750 - Recreation							
251-750-970.000	Capital Outlay	0	12,000	0	12,350	12,758	13,179
251-750-983.000	Leased Assets	0	0	0	0	0	0
	Totals for department 750 - Recreation	*0*	*12,000*	*0*	*12,350*	*12,758*	*13,179*
Department 759 - Pool/Fitness Facility Operations							
251-759-702.000	Administration Wages	0	0	0	26,365	27,235	28,134
251-759-704.000	Part-Time Wages	27,370	55,000	36,889	57,750	59,656	61,624
251-759-711.000	Social Security & Medicare	1,693	5,200	2,930	5,200	5,200	5,200
251-759-712.000	Medical Insurance	0	0	0	0	0	0
251-759-712.001	Medical Insurance - Employee Cont.	0	0	0	0	0	0
251-759-712.002	Retirement - HCSP	0	0	0	0	0	0
251-759-713.000	Life Insurance	0	0	0	0	0	0
251-759-714.000	Retirement - DB (Active Employees)	0	0	0	0	0	0
251-759-714.001	Retirement - Employee Contribution	0	0	0	0	0	0
251-759-715.000	Worker's Compensation	1,405	1,050	1,499	1,400	1,400	1,400
251-759-716.000	Unemployment Compensation	0	0	0	0	0	0
251-759-727.000	Office Supplies	0	0	0	0	0	0
251-759-728.000	Postage	0	0	0	0	0	0
251-759-731.000	Operating Supplies	6,149	8,500	6,136	8,500	8,500	8,500
251-759-731.500	Pool Chemicals	0	6,500	959	3,500	3,500	3,500
251-759-733.000	Janitorial Supplies	0	150	0	0	0	0
251-759-738.000	Licenses & Permits	156	150	296	150	150	150
251-759-803.000	Janitorial Contract	1,394	9,000	4,402	7,500	7,500	7,500
251-759-809.000	Contractual Services	0	0	0	0	0	0
251-759-827.000	Administrative Service Charge	14,230	13,669	13,992	14,120	14,586	15,067

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
251-759-827.200	Charges for Services - IT	2,809	2,848	2,848	2,942	3,039	3,139
251-759-851.000	Communications	0	0	0	0	0	0
251-759-880.200	Swim Team	11,164	42,500	14,041	43,500	44,936	46,418
251-759-880.300	Suits & Sweats/uniforms	2,316	0	504	1,250	1,250	1,250
251-759-880.400	Synchronized Swimming	0	250	(632)	250	250	250
251-759-890.000	Service Charges	1,259	200	721	1,000	1,000	1,000
251-759-920.000	Public Utilities	4,691	12,500	8,893	10,000	10,000	10,000
251-759-920.300	Utilities - Water	5,577	10,000	3,886	10,000	10,000	10,000
251-759-929.000	Equipment Maintenance	345	3,500	279	2,500	2,500	2,500
251-759-929.500	Pool Maintenance	18,792	12,500	24,745	15,000	15,495	16,006
251-759-931.000	Building Maintenance	15,489	12,500	650	15,000	15,495	16,006
251-759-970.000	Capital Outlay	0	0	0	0	0	0
Totals for dept 759 - Pool/Fitness Facility Operations		*114,839*	*196,017*	*123,038*	*225,927*	*231,691*	*237,646*
TOTAL APPROPRIATIONS		**114,839**	**208,017**	**123,038**	**238,277**	**244,449**	**250,824**
NET OF REVENUES/APPROPRIATIONS - FUND 251		109,617	21,539	113,865	(1,837)	(386)	1,114
BEGINNING FUND BALANCE		45,588	155,205	155,205	176,744	174,907	174,521
ENDING FUND BALANCE		155,205	176,744	269,070	174,907	174,521	175,635

258. Segregated Capital Assets Fund – Parks Special Revenue Fund (SCAF-PSRF)

The Segregated Capital Assets Fund (SCAF) includes settlement funds that are invested in various accounts. SCAF consists of two constituent parts – a Parks Special Revenue Fund invested under the terms of Section 7a of Public Act 20 of 1943 (MCL 129.97a), and a Remainder Fund invested under the terms of Section 1 of Public Act 20 of 1943 (MCL 129.91).

As restricted by Sections 2-255 through 2-263 of the City's Code of Ordinances, the City may use interest and investment returns for purposes specified in the Ordinance. The principal balance of the funds ("corpus") may not be used, spent, or diverted without a supermajority vote of the Commission following the procedures set forth in Section 2-261 of the Code of Ordinances.

The restricted corpus (principal) amount of the SCAF is $3,242,872, which was the settlement amount received by the City during fiscal year 1995. On January 13, 2015, the City Commission passed ordinance 408 which created the SCAF Parks Special Revenue Fund (SCAF-PSRF) and allocated $2,000,000 of the total SCAF principal balance to the SCAF-PSRF and by ordinance established that that protected corpus (principal) balance be indexed for inflation. This left $1,242,872 as the restricted corpus (principal) balance of the SCAF Remainder Fund (SCAF-RF). The SCAF-RF principal balance is not indexed for inflation.

The SCAF-PSRF was invested in March of 2015. For the purposes of inflation indexing, the City uses the Consumer Price Index for All Urban Consumers (CPI-U) for the Detroit-Ann Arbor-Flint, MI region as calculated by the United States Bureau of Labor Statistics.[4] The baseline CPI-U value for the SCAF-PSRF is 221.784, the annual value for 2014 which was the most recent available annual published value when the SCAF-PSRF was invested. The SCAF-PSRF restricted corpus (principal) balance is updated each year using the annual CPI-U value for the year preceding for budgeting purposes.

The following table summarizes the yearly performance of the SCAF-PSRF, the CPI-U value, and preceding year cash returns. The funds available for spending are the greater of the market value of the fund minus the inflation-indexed corpus value, or the preceding year cash returns. The SCAF-PSRF fund is projected to return $100,000 in cash returns over the July 1, 2021 through June 30, 2022 period.

A total of $300,000 has been withdrawn from the SCAF-PSRF over the course of its existence to support recreation capital investments: $100,000 in FY18 to fund the renovation of the Big Room at the Community Center, and $100,000 each in FY20 and FY21 to support the construction of the pavilions at the pool and Gainsboro Park. Even with these withdrawals, the SCAF-PSRF fund has grown to $2,819,357 as of March 31, 2022. When the $300,000 of withdrawals are included, the SCAF-PSRF has grown by 56% in the 7 years since 2015.

[4] https://data.bls.gov/timeseries/CUURS23BSA0?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true

SCAF-PSRF Summary Table

Date	Market Value	CPI-U Value	Inflation-Indexed Corpus Value	Preceding Year Cash Returns	Available Funds
March 31, 2015	$2,000,000	221.784	$2,000,000	--	--
March 31, 2016	$1,947,373	218.706	$1,972,243	$17,547	$17,547
March 31, 2017	$2,132,749	222.167	$2,003,454	$49,386	$129,295
March 31, 2018	$2,196,323	226.896	$2,046,099	$52,867	$150,224
March 31, 2019	$2,309,551	232.250	$2,094,380	$58,791	$215,171
March 31, 2020	$2,104,435	235.267	$2,121,587	$59,952	$59,952
March 31, 2021	$2,742,926	237.659	$2,143,157	$57,856	$599,769
March 31, 2022	$2,819,357	247.805	$2,234,652	$113,219	$584,705

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 258 - SCAF PARKS SPECIAL REVENUE FUND							
ESTIMATED REVENUES							
258-000-665.000	Interest & Dividend Income	57,856	50,000	49,583	60,000	61,980	64,025
258-000-665.100	Investment gains and losses	533,593	0	(123,683)	0	0	0
TOTAL REVENUES		**591,449**	**50,000**	**(74,100)**	**60,000**	**61,980**	**64,025**
APPROPRIATIONS							
Department 966 - Transfers Out							
258-966-999.101	Transfers Out - General Fund	0	0	0	0	0	0
258-966-999.251	Transfers Out - Pool Operating	0	0	0	0	0	0
258-966-999.259	Transfers Out - SCAF-RF	0	0	0	0	0	212,257
258-966-999.401	Transfers Out - Capital Improvement	100,000	0	0	75,000	0	0
	Totals for department 966 - Transfers Out	*100,000*	*0*	*0*	*75,000*	*0*	*212,257*
TOTAL APPROPRIATIONS		**100,000**	**0**	**0**	**75,000**	**0**	**212,257**
NET OF REVENUES/APPROPRIATIONS - FUND 258		491,449	50,000	(74,100)	(15,000)	61,980	(148,232)
BEGINNING FUND BALANCE		2,402,008	2,893,457	2,893,457	2,943,457	2,928,457	2,990,437
ENDING FUND BALANCE		2,893,457	2,943,457	2,819,357	2,928,457	2,990,437	2,842,205

259. Segregated Capital Assets Fund Remainder Fund (SCAF-RF)

$1,242,872 is the restricted corpus (principal) balance of the SCAF Remainder Fund (SCAF-RF). The SCAF-RF principal balance is not indexed for inflation. The SCAF-RF has been used to finance the construction of Gainsboro Park. The recreation expenditures will be repaid using the Parks Special Revenue Fund money from Fund 258, and the park improvement millage which runs through FY24-25.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 259 - SCAF REMAINDER FUND							
ESTIMATED REVENUES							
259-000-406.500	Parks Improvement Taxes	108,532	111,101	106,504	23,149	23,913	24,702
259-000-540.000	State Grant	0	0	0	0	0	0
259-000-573.000	Local Community Stabilization	541	500	918	500	500	500
259-000-665.000	Interest & Dividend Income	5,947	1,000	2,772	1,000	1,000	1,000
259-000-665.100	Investment gains and losses	0	0	0	0	0	0
259-000-665.260	Interest Income - DDA	0	0	0	0	0	0
259-000-699.101	Transfers In - General Fund	0	0	0	0	0	0
259-000-699.218	Transfers In - Infrastructure	0	0	0	0	0	0
259-000-699.258	Transfers In - SCAF-PSRF	0	0	0	0	0	212,257
TOTAL REVENUES		**115,020**	**112,601**	**110,194**	**24,649**	**25,413**	**238,459**
APPROPRIATIONS							
Department 248 - General Government							
259-248-890.000	Service Charges	227	200	230	200	200	200
	Totals for department 248 - General Government	*227*	*200*	*230*	*200*	*200*	*200*
Department 910 - Capital Assets							
259-910-970.750	Capital Outlay - Recreation	0	0	0	0	0	0
	Totals for department 248 - General Government	*0*	*0*	*0*	*0*	*0*	*0*
Department 966 - Transfers Out							
259-966-999.218	Transfers Out - Infrastructure	0	0	0	0	0	0
259-966-999.251	Transfers Out - Pool Operating	0	0	0	0	0	0
259-966-999.351	Transfers Out - Debt Service	0	0	0	0	0	0
	Totals for department 966 - Transfers Out	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL APPROPRIATIONS		**227**	**200**	**230**	**200**	**200**	**200**
NET OF REVENUES/APPROPRIATIONS - FUND 259		114,793	112,401	109,964	24,449	25,213	238,259
BEGINNING FUND BALANCE		727,937	842,730	842,730	955,131	979,580	1,004,793
FUND BALANCE ADJUSTMENTS							
ENDING FUND BALANCE		842,730	955,131	952,694	979,580	1,004,793	1,243,052

260. Downtown Development Authority

Fund 260 provides for the collection of TIFA taxes and the expenditure of funds on activities in support of the Downtown Development Authority's Development Plan. The DDA paid for the alley reconstruction from 10 Mile to Devonshire during the 2015-16 through 2017-18 budget years. In FY23 the DDA will fund the reconstruction of the Woodward streetscape, including the addition of a cycle track from Sylvan to I-696, a $1.6 million project that is being funded in part by $1 million in grants from EGLE and MDOT.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 260 - DOWNTOWN DEVELOPMENT AUTHORITY							
ESTIMATED REVENUES							
260-000-405.000	T.I.F.A. Taxes	100,788	105,448	94,893	103,445	106,858	110,385
260-000-410.500	Delinquent Tax Collection	779	100	153	100	100	103
260-000-540.000	State Grant	0	0	0	0	0	0
260-000-573.000	Local Community Stabilization	3,474	2,500	3,909	2,500	2,500	2,583
260-000-665.000	Interest & Dividend Income	110	25	336	25	25	26
260-000-671.000	Miscellaneous Other Revenues	0	250	0	250	250	250
260-000-675.000	Contributions & Donations	28,481	0	0	0	0	0
TOTAL REVENUES		**133,632**	**108,323**	**99,291**	**106,320**	**109,733**	**113,346**
APPROPRIATIONS							
Department 730 - Development Activities							
260-730-731.000	Operating Supplies	0	0	0	0	0	0
260-730-740.200	Sales Tax Expense	0	0	0	0	0	0
260-730-809.000	Contractual Services	71,170	75,000	56,882	35,000	20,000	20,000
260-730-827.000	Administrative Service Charge	14,200	14,200	14,200	14,200	14,200	14,200
260-730-880.000	Community Promotion	0	1,000	0	1,000	1,000	1,000
260-730-890.000	Service Charges	1,379	500	513	500	500	500
260-730-955.000	Miscellaneous Expenses	0	50	0	50	50	50
260-730-955.200	Concerts in the Park	0	0	0	0	0	0
260-730-955.400	Brick Paver Program	0	0	0	0	0	0
260-730-955.500	Development Grant	0	500	0	500	500	500
260-730-970.000	Capital Outlay	0	0	0	0	0	0
260-730-991.100	Principal: Governmental Debt	0	0	0	0	0	0
260-730-995.100	Interest: Governmental Debt	0	0	0	0	0	0
260-730-999.218	Transfers Out - Infrastructure	0	0	0	250,000	75,000	75,000
Totals for department 730 - Development Activities		*86,749*	*91,250*	*71,595*	*301,250*	*111,250*	*111,250*
TOTAL APPROPRIATIONS		**86,749**	**91,250**	**71,595**	**301,250**	**111,250**	**111,250**
NET OF REVENUES/APPROPRIATIONS - FUND 260		46,883	17,073	27,696	(194,930)	(1,517)	2,096
BEGINNING FUND BALANCE		188,367	235,250	235,250	252,323	57,393	55,876
ENDING FUND BALANCE		235,250	252,323	262,946	57,393	55,876	57,972

271. Library Fund

Fund 271 provides for the collection of library services taxes and the annual payment of Pleasant Ridge's contract with the Huntington Woods library. Library services are funded by a 0.3380 mill property tax approved by the voters in 2019 for tax years 2020-21 through 2024-25.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 271 - LIBRARY FUND							
ESTIMATED REVENUES							
271-000-407.000	Library Taxes	57,989	59,355	56,896	60,654	62,656	64,724
271-000-573.000	Local Community Stabilization	289	0	239	0	0	0
271-000-665.000	Interest & Dividend Income	1	20	1	20	20	20
TOTAL REVENUES		**58,279**	**59,375**	**57,136**	**60,674**	**62,676**	**64,744**
APPROPRIATIONS							
Department 299 - Library							
271-299-800.000	Library Services Contract	43,640	44,008	45,080	47,334	48,896	50,510
271-299-827.000	Administrative Service Charge	13,911	14,106	14,106	14,000	14,462	14,939
271-299-890.000	Service Charges	212	175	128	175	175	175
	Totals for department 299 - Library	*57,763*	*58,289*	*59,314*	*61,509*	*63,533*	*65,624*
TOTAL APPROPRIATIONS		**57,763**	**58,289**	**59,314**	**61,509**	**63,533**	**65,624**
NET OF REVENUES/APPROPRIATIONS - FUND 271		516	1,086	(2,178)	(835)	(857)	(880)
BEGINNING FUND BALANCE		10,908	11,424	11,424	12,510	11,675	10,818
ENDING FUND BALANCE		11,424	12,510	9,246	11,675	10,818	9,938

297. Historical Fund

Fund 297 provides for the funding of projects and activities undertaken by the Historical Commission. These activities are funded by the Commission's annual Home and Garden tour.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 297 - HISTORICAL FUND							
ESTIMATED REVENUES							
297-000-642.000	Sales	560	250	160	250	250	250
297-000-651.000	Use & Admission Fees	0	5,000	3,315	3,000	3,000	3,000
297-000-654.000	Ticket Sales & Field Trips	320	0	0	0	0	0
297-000-665.000	Interest & Dividend Income	1	10	0	10	10	10
297-000-675.000	Contributions & Donations	0	350	900	350	350	350
TOTAL REVENUES		**881**	**5,610**	**4,375**	**3,610**	**3,610**	**3,610**
APPROPRIATIONS							
Department 803 - Historic Activities							
297-803-727.000	Office Supplies	0	0	0	0	0	0
297-803-728.500	Newsletter Delivery	0	0	0	0	0	0
297-803-731.000	Operating Supplies	161	5,000	5,295	3,000	3,000	3,000
297-803-740.200	Sales Tax Expense	0	30	0	0	0	0
297-803-827.000	Administrative Service Charge	0	0	0	0	0	0
297-803-890.000	Service Charges	109	100	57	100	100	100
297-803-931.000	Building Maintenance	0	650	1,549	650	650	650
297-803-955.000	Miscellaneous Expenses	50	500	0	200	200	200
297-803-970.000	Capital Outlay	0	0	0	0	0	0
	Totals for department 803 - Historic Activities	*320*	*6,280*	*6,901*	*3,950*	*3,950*	*3,950*
TOTAL APPROPRIATIONS		**320**	**6,280**	**6,901**	**3,950**	**3,950**	**3,950**
NET OF REVENUES/APPROPRIATIONS - FUND 297		561	(670)	(2,526)	(340)	(340)	(340)
BEGINNING FUND BALANCE		14,093	14,654	14,654	13,984	13,644	13,304
ENDING FUND BALANCE		14,654	13,984	12,128	13,644	13,304	12,964

301. Debt Service (Voted Bonds)

This fund accounts for the repayment of the current portion of debt principal and interest due during the current fiscal year on general obligation unlimited tax debt, as approved by the electors. The debt was used to construct the pool and wellness center and was issued in 2003, and the final payment will be in FY29.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 301 - Debt Service (Voted Bonds)							
ESTIMATED REVENUES							
301-000-404.000	Debt Service Property Taxes	195,070	192,644	184,543	190,820	197,117	203,622
301-000-573.000	Local Community Stabilization	1,102	0	934	900	900	900
301-000-665.000	Interest & Dividend Income	0	0	0	0	0	0
TOTAL REVENUES		**196,172**	**192,644**	**185,477**	**191,720**	**198,017**	**204,522**
APPROPRIATIONS							
Department 905 - Long-Term Debt Retirement							
301-905-809.000	Contractual Services	1,000	1,500	1,000	1,500	1,500	1,500
301-905-816.000	Paying Agent Fees	0	750	0	750	750	750
301-905-991.047	Principal: Community Center Debt	125,000	150,000	150,000	150,000	150,000	175,000
301-905-995.047	Interest: Community Center Debt	56,900	51,587	51,588	45,212	38,837	32,462
	Totals for department 905 - Long-Term Debt Retirement	*182,900*	*203,837*	*202,588*	*197,462*	*191,087*	*209,712*
TOTAL APPROPRIATIONS		**182,900**	**203,837**	**202,588**	**197,462**	**191,087**	**209,712**
NET OF REVENUES/APPROPRIATIONS - FUND 301		13,272	(11,193)	(17,111)	(5,742)	6,930	(5,190)
BEGINNING FUND BALANCE		17,274	30,546	30,546	19,353	13,611	20,542
ENDING FUND BALANCE		30,546	19,353	13,435	13,611	20,542	15,352

401. Capital Improvement Fund

The Capital Improvement Fund provides for non-infrastructure capital projects over $5,000 in cost. The Capital Improvement Fund will allow the City to save for large purchases over multiple budget years to ensure that the City can maintain investment in its facilities and equipment. The Capital Improvement Fund pays for new police vehicles and is used to fund building and facilities maintenance and improvements, as necessary.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 401 - Capital Improvement Fund							
ESTIMATED REVENUES							
401-000-665.000	Interest & Dividend Income	990	0	187	0	0	0
401-000-675.000	Contributions & Donations	0	0	25,695	0	0	0
401-000-699.101	Transfers In - General Fund	50,000	100,000	100,000	100,000	100,000	100,000
401-000-699.202	Transfers In - Major Streets	0	0	0	0	0	0
401-000-699.218	Transfers In - Infrastructure	0	0	0	0	0	0
401-000-699.258	Transfers In - SCAF-PSRF	100,000	0	0	75,000	0	0
TOTAL REVENUES		**150,990**	**100,000**	**125,882**	**175,000**	**100,000**	**100,000**
APPROPRIATIONS							
Department 901 - Capital Outlay							
401-901-970.440	Capital Outlay - Public Works	0	0	0	0	0	0
	Totals for department 910 - Capital Assets	*0*	*0*	*0*	*0*	*0*	*0*
Department 910 - Capital Assets							
401-910-970.003	Capital Outlay - Facilities	0	0	506	75,000	15,000	15,000
401-910-970.300	Capital Outlay - Police	30,989	55,000	188	0	60,000	0
401-910-970.446	Capital Outlay - Streets & Alleys	0	0	0	0	0	0
401-910-970.750	Capital Outlay - Recreation	134,923	70,000	66,477	40,000	40,000	40,000
	Totals for department 910 - Capital Assets	*165,912*	*125,000*	*67,171*	*115,000*	*115,000*	*55,000*
Department 910 - Capital Assets							
401-920-890.000	Service Charges	764	100	426	100	100	100
	Totals for department 910 - Capital Assets	*764*	*100*	*426*	*100*	*100*	*100*
TOTAL APPROPRIATIONS		**166,676**	**125,100**	**67,597**	**115,100**	**115,100**	**55,100**
NET OF REVENUES/APPROPRIATIONS - FUND 401		(15,686)	(25,100)	58,285	59,900	(15,100)	44,900
BEGINNING FUND BALANCE		218,990	203,304	203,304	178,204	238,104	223,004
ENDING FUND BALANCE		203,304	178,204	261,589	238,104	223,004	267,904

E. Enterprise Funds

592. Water and Sewer Fund

The water and sewer fund is responsible for the distribution of water and maintenance and repair of water mains, valves, hydrants, meters and other appurtenant parts of the system. This department is also responsible for the removal of sanitary sewerage and storm water, and maintenance of catch basins and other parts of the combined sewer system. Finally, the department also handles billing, record maintenance, and other customer-related activities associated with the utility.

The FY23 budget includes capital outlay for a full water main and lead service line replacement on Kensington. By State mandate the water utility is responsible for replacing all lead service leads, both public and private portions, from the main to the meter inside of each home and business. About 75% of water customers have complete or partial lead service leads, so this will be an extraordinary cost that will be borne by the ratepayers to the utility over the coming 20-30 years.

The water rate has been adjusted this year to reflect the passage of the water infrastructure millage and the subsequent rate structure recommended by the Water Infrastructure Funding Citizens Advisory Committee (CAC). The rate structure uses three methods in equal 1/3 shares to raise funding for water infrastructure projects: the millage, flat ready-to-serve charges, and a frontage-foot charge that is based on the width of each property.

The FY23 budget also includes moderately increased maintenance and operation costs as the City is transitioning from Royal Oak to the Oakland County Water Resources Commissioner for water and sewer maintenance. The State also has new operating requirements which will create some minor additional costs.

Account Number	Description	Actual 2020-21	Budget 2021-22	Activity to 05/01/22	Requested 2022-23	Projected 2023-24	Projected 2024-25
Fund 592 - WATER AND SEWER FUND							
ESTIMATED REVENUES							
592-000-401.600	Water Infrastructure Taxes	0	0	0	304,833	314,892	325,284
592-000-531.000	Federal Grants	0	245,000	127,422	650,000	0	0
592-000-642.000	Sales	1,126,160	1,350,000	1,065,763	1,443,528	1,491,164	1,540,373
592-000-645.000	Storm Water Runoff Fees	363,273	379,950	252,000	395,365	403,272	411,338
592-000-650.000	IWC Charges	4,703	4,500	3,919	4,500	4,500	4,500
592-000-662.000	Utility Bill Penalties	216	10,000	22,157	12,500	12,500	12,500
592-000-665.000	Interest & Dividend Income	9,610	7,500	2,367	7,500	7,500	7,500
592-000-671.000	Miscellaneous Other Revenues	0	0	0	0	0	0
592-000-678.000	Res. Sewer Lead Reimbursement	0	0	0	0	0	0
592-000-679.000	Refunds & Rebates	0	0	0	0	0	0
592-000-699.218	Transfers In - Infrastructure	0	0	0	50,000	0	150,000
TOTAL REVENUES		**1,503,962**	**1,996,950**	**1,473,628**	**2,868,226**	**2,233,829**	**2,451,494**
APPROPRIATIONS							
Department 536 - Water & Sewer Systems							
592-536-702.000	Administration Wages	43,811	45,900	38,823	51,495	53,812	56,234
592-536-704.000	Part-Time Wages	0	7,500	0	12,000	13,000	14,000
592-536-711.000	Social Security & Medicare	3,143	3,600	2,798	3,600	3,600	3,600
592-536-712.000	Medical Insurance	10,989	8,200	11,031	12,000	12,396	12,805

592-536-712.001	Medical Insurance - Employee Cont.	(1,126)	0	(952)	0	0	0
592-536-712.002	Retirement - HCSP	724	500	670	500	500	500
592-536-712.003	Medical Insurance - Retirees	2,061	800	1,267	2,150	2,221	2,294
592-536-712.004	Medical Insurance - Retiree Cont.	(163)	0	(163)	0	0	0
592-536-712.005	Medical Insurance - HSA	1,740	500	1,753	1,800	1,850	1,900
592-536-713.000	Life Insurance	401	150	381	150	150	150
592-536-714.000	Retirement - DB (Active Employees)	587	0	840	600	600	600
592-536-714.001	Retirement - Employee Contribution	0	0	0	0	0	0
592-536-714.003	Retirement - DB (Retirees)	4,538	18,000	5,012	4,750	4,907	5,069
592-536-714.500	Retirement - DC (Active Employees)	2,599	2,450	2,302	2,750	2,841	2,934
592-536-715.000	Worker's Compensation	300	225	320	300	300	300
592-536-716.000	Unemployment Compensation	4	20	5	20	20	20
592-536-728.000	Postage	2,942	3,000	1,573	3,000	3,000	3,000
592-536-731.000	Operating Supplies	0	0	958	0	0	0
592-536-736.000	Computer Supplies	0	0	0	0	0	0
592-536-809.000	Contractual Services	14,196	15,000	20,496	17,500	17,500	17,500
592-536-810.000	Public Works Contract	32,355	40,000	123,422	100,000	100,000	100,000
592-536-814.000	Engineering Services	10,834	70,000	40,439	75,000	75,000	75,000
592-536-818.000	Water Purchases	198,061	227,366	135,643	206,500	211,663	216,954
592-536-819.000	Sewage Treatment	259,803	232,000	173,232	240,320	245,126	250,029
592-536-819.500	Storm Water Treatment	394,687	379,950	284,891	395,365	403,272	411,338
592-536-820.000	IWC Charges	3,156	6,200	2,453	6,200	6,200	6,200
592-536-827.000	Administrative Service Charge	31,534	31,849	31,849	32,900	33,986	35,107
592-536-827.200	Charges for Services - IT	16,847	17,083	17,083	17,647	18,229	18,831
592-536-861.000	Mileage Allowance	0	0	167	175	175	175
592-536-890.000	Service Charges	1,515	2,000	1,461	2,000	2,000	2,000
592-536-906.000	Printing Water Bills	884	3,900	907	2,000	2,000	2,000
592-536-910.000	Insurance & Bonds	20,000	20,000	20,000	20,000	20,000	20,000
592-536-929.000	Equipment Maintenance	0	2,000	0	2,000	2,000	2,000
592-536-937.000	Water Meter Maintenance	198,634	60,000	60,770	12,500	10,000	10,000
592-536-939.000	Sewer Maintenance	59,587	20,000	9,755	40,000	40,000	40,000
592-536-955.000	Miscellaneous Expenses	16	1,000	2,800	1,000	1,000	1,000
592-536-956.000	Conferences and Workshops	0	350	1,183	350	350	350
592-536-958.000	Memberships and Dues	1,500	2,000	1,600	2,000	2,000	2,000
592-536-964.000	Refunds	0	2,000	0	2,000	2,000	2,000
592-536-968.000	Depreciation & Depletion	0	0	0	0	0	0
592-536-970.000	Capital Outlay	257,305	100,000	136,348	1,550,000	0	1,650,000
592-536-970.594	Capital Outlay - Sewer Projects	141,387	120,000	80,269	150,000	150,000	150,000
592-536-991.000	Principal: GWK Drain Debt	0	101,000	110,323	101,000	101,000	101,000
592-536-995.000	Interest: GWK Drain Debt	9,156	9,750	7,362	9,750	9,750	9,750
592-536-996.001	Paying Agent Fees	0	250	0	250	250	250
	Totals for department 536 - Water & Sewer Systems	*1,724,007*	*1,554,543*	*1,329,071*	*3,081,572*	*1,552,698*	*3,226,890*
TOTAL APPROPRIATIONS		**1,724,007**	**1,554,543**	**1,329,071**	**3,081,572**	**1,552,698**	**3,226,890**
NET OF REVENUES/APPROPRIATIONS - FUND 592		(220,045)	442,407	144,557	(213,346)	681,131	(775,396)
BEGINNING FUND BALANCE		1,139,325	919,280	919,280	1,361,687	1,148,341	1,829,472
ENDING FUND BALANCE		919,280	1,361,687	1,063,837	1,148,341	1,829,472	1,054,076

Water and Sewer Enterprise Fund Fund Balance Notes

- Reported Fund Balance. In prior budgets, the fund balance for the water and sewer fund has been based on the net position in the City's annual financial statements. However, the net position includes noncurrent (i.e. non-liquid) assets such as capital assets that are being depreciated (mostly the pipes in the ground), along with noncurrent liabilities such as the noncurrent portion of long-term debt. Neither capital assets nor noncurrent debt has any impact on the ability of the water fund to handle the day-to-day operations of the water and sewer department. Similarly, they have no bearing on the ability of the water and sewer fund to fix a water main break or to repair a sewer.

  For the above reasons, beginning with the FY18 budget, working capital is the water and sewer enterprise fund balance that is reported for budgetary purposes. Working capital is defined as cash and cash equivalents plus liquid investments minus current liabilities. Refer to the water and sewer enterprise fund statement of net position in the City's most recent financial statements for a detailed accounting of all current and noncurrent assets and liabilities.

- Water and Sewer Enterprise Fund Fund Balance Policy. The City's policy is to maintain a minimum fund balance of $1,443,135 in the Water and Sewer Enterprise Fund. This is to provide sufficient liquidity to meet current, future, and emergency spending needs. The minimum fund balance target is derived as follows:

  - 90 days of operations ($1,536,000/4 = $384,000); plus
  - Annual debt service ($111,000); plus
  - Emergency capital replacement, or 5% of net book value of assets ($962,699 * 0.05 = $48,135); plus
  - Planned capital replacement (average of $900,000 annually)

  The target minimum fund balance is therefore $384,000 + $111,000 + $48,135 + $900,000 = $1,443,135.

  The average projected end of year fund balance for FY23-25 is $1,343,963. This is somewhat below our target amount due to the large annual cost for capital projects but is still a reasonable capital reserve to address any emergency spending needs that the city may encounter.

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: June 8, 2022

Re: Drinking Water State Revolving Fund Project Plan

Overview

Attached is a draft Drinking Water State Revolving Fund Project Plan ("the plan"). The plan is supporting an application to the DWSRF to fund the City's water infrastructure project. We are applying for a DWSRF funding in the form of a low-interest loan and potentially principal forgiveness to construct the entire water infrastructure project over the course of 4-5 years.

Background

The attached plan presents our water infrastructure project and is necessary to support our application for DWSRF funding. All Federal infrastructure money for water infrastructure is being distributed through the DWSRF in each state. To access Federal infrastructure money, we must apply to the DWSRF. As of the date of this memo, Michigan's DWSRF has about $250 million in available funding this year, which includes the Federal infrastructure money. The State received over $1 billion in project funding requests, so this money will be competitive, and we are not assured of receiving funding.

Approval of the project plan will remain valid for 5 years, so we can re-apply each year with this project plan if our application is not successful this year.

The proposed project plan would allow us to implement the water infrastructure project over the course of 4 to 5 years. The project plan includes all the elements of this project that we have discussed over the past two years, including replacing all our undersized 100-year-old cast iron water mains, replacing all lead service lines, and constructing new water mains along Woodward and Indiana to provide reliability and fire flow improvements by increasing looping in the system.

Mike Smith and Brett McDonald from AEW, the City engineers, will be present on June 14 to present the plan and answer any questions.

Requested Action

Following the public hearing, City Commission adoption of the Plan, including adoption of the selected alternative and that the City Manager be designated the Authorized Representative for all activities associated with the project.

Drinking Water State Revolving Fund Loan Program

DRAFT Project Plan
Water Main Replacement and Lead Service Line Replacement Program

Prepared for

City of Pleasant Ridge

May 2022

AEW Project No. 0175-0128

Prepared By:

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS

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Appendices

A. City of Pleasant Ridge Water Distribution Map
B. City of Pleasant Ridge Drinking Water Asset Management Plan
C. SEMCOG Community Profile
D. Contaminated Sites RRD List
E. Soil Reference Report
F. USFWS Response and Documentation
G. Proposed Water Main Replacement Summary
H. Preliminary Cost Estimates
I. GLWA Source Water Protection Plan
J. Peak Hour, Fire Flow Conditions – Existing vs. Proposed
K. City of Pleasant Ridge Water Distribution System Reliability Study and Master Plan

1.0 EXECUTIVE SUMMARY

This Project Plan was prepared for the City of Pleasant Ridge in accordance with the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Drinking Water State Revolving Fund (DWSRF) Project Plan Preparation Guidance (May 2016). This Project Plan has been prepared based upon the City of Pleasant Ridge's Approved Drinking Water Asset Management Plan, the City's Current Water Distribution System Reliability Study and Master Plan and the City's Preliminary Distribution System Materials Inventory.

Financial assistance for this project is being sought through EGLE. The DWSRF provides for financial assistance in the form of low interest loans of which portions of the principal may be forgiven. DWSRF rules call for compliance with basic federal planning requirements of the National Environmental Policy Act (NEPA). The Final Project Plan serves as a basis of project prioritization by EGLE.

The City of Pleasant Ridge is a strong steward of drinking water management, and takes a proactive position in protecting its residents and property owners. Through development and implementation of the Drinking Water Asset Management Plan and a Water Reliability Study, the insight and understanding of the system's drinking water assets has significantly improved. A comprehensive investigation included condition assessment of assets, capital improvement needs, minimum capacity needs, reliability improvements and counts of all assets and services. Based on this investigation, the City estimates that 70% of it's water main (40,000 L.F.) is beyond its useful life and 57% (31,500 L.F.) of its water main is restricting the minimum capacity for fighting fire based upon its size. Furthermore, approximately 75% of the City's service lines (825 Services) are known to contain lead or galvanized coatings. Michigan's Lead and Copper Rule requires that a minimum of 5% of the lead service lines be replaced each year beginning in 2021 and to be complete by December 31, 2024.

The City desires to replace and upgrade water mains in accordance to their approved Capital Improvement Plan and Water Reliability Study and Master Plan for a 20-year DWSRF low-interest loan in the amount of $24,525,000 that will include the replacement of lead water services. This project is being submitted as one project that would be implemented and completed over a 4-year period.

2.0 PROJECT BACKGROUND

2.1 Study Area Characteristics

Undeveloped Oakland County was better known as the "Great Swamp" when first officially surveyed in 1817, according to Charles H. Martinez. A strip of land in what is now Pleasant Ridge, however, was once an "elevated and ancient beach ridge", easily traveled on foot and horseback. The ridge here became Ridge Road and formed the basis for a town. In 1919, 90 of the 320 residents voted to incorporate their ridge as a village, and in 1928, with 2,289 residents, the village became the smallest City in Michigan at the time, covering just over one-half square miles. The City of Pleasant Ridge consistently grew upon becoming a City and reached its peak population in 1970 of 3,989 people. Since 1970, the population has steadily decreased to its current population of approximately 2,600 people.

The City of Pleasant Ridge has been a built-out community for several decades encompassing 0.57 square miles in southeastern Oakland County. Development in the City consists primarily of single-family residential areas. Commercial development lies predominately along Woodward Avenue (M-1) and at the northeastern corner of the City along the CN Railroad R.O.W. "Just one and a half miles north of Detroit with an archetypal small-town personality, Pleasant Ridge has about 2,600 residents, many of whom brim with hometown pride." – Former Mayor Kurt Metzger

The City of Pleasant Ridge has municipal water services throughout the entire City. The water distribution system within the City is owned by the City and maintained by a contracted vendor (currently Oakland County Water Resources Commission). The City purchases it's drinking water from the Great Lakes Water Authority (GLWA) via the Southeastern Oakland County Water (SOCWA), provided at one (1) connection point near the southern City border (Woodward Ave and Oxford Blvd).

The study area for this DWSRF project plan consists of the entire water distribution system service area, and considers the next 20 years. The water distribution system was established as the City was developing between the 1920's to the 1950's, and services only the City of Pleasant Ridge. In 2016, the City completed an update to it's Water Distribution System Reliability Study and Master Plan to obtain a better understanding of the current system capacity and identification of deficiencies. Based upon the updated water reliability study and master plan, there is a great need for replacement of undersized six-inch water mains in order to provide flow for peak hour firefighting demands. In addition, there is a need for looping of the system, especially on the east side of the City along Indiana Avenue and along SB Woodward from Oakland Park Blvd to Elm Park Ave. Furthermore, in 2018, the City prepared a Drinking Water Asset Management Plan to obtain a better understanding of the current condition of the water distribution system and to be able to prioritize improvements to its system. Based upon the development of the asset management plan, there is a great need for the replacement of aging water distribution infrastructure. This asset management plan was reviewed and approved by EGLE WRD Staff in 2021.

2.2 Economic Characteristics

The City of Pleasant Ridge is primarily a residential community with small scale commercial businesses. The City's residential building boom took place from the late 1920's through the 1950's with the expansion of the automobile industry in the City of Detroit and other nearby communities in addition to people moving out away from the City of Detroit after World War II.

Per the Southeast Michigan Council of Governments (SEMCOG), as of 2022, the median household income was $122,813 and the per capita income at $69,930. Daytime population is estimated at 1,760 people, and approximately 969 jobs are had within Pleasant Ridge. Furthermore, 2.8

percent of the population is unemployed and only 3.9 percent of the population lives in poverty.

2.3 Existing Water Distribution Facilities

The City of Pleasant Ridge, located near I-696 and Woodward Avenue (M-1) in Oakland County, owns and operates a water distribution system, which serves the City of Pleasant Ridge. The City purchases it's drinking water from the GLWA via the SOCWA, and then distributes it within the City via their own water distribution system. The City's water distribution system services 1,147 customers, and their customer demographics are 98% residential and 2% commercial. The known major water assets owned by the City are as follows:

1. Water Mains
    i. Approximately 11 miles
2. Water Structures and Valves
    i. 104 valves, including gate wells and d-boxes
3. Fire Hydrants
    i. 97 fire hydrants
4. Water Service Lines
    i. 1,147 Total Service Lines
        1. 825 Lead or Galvanized Service Lines
            a. 550 Entirely Lead or Galvanized
            b. 275 Partial Lead or Galvanized (Public Side Only)
        2. 322 Copper Service Lines
5. Water System Connections
    i. 1 Metered Connection to SOCWA
    ii. 4 Emergency Connections (3 to Ferndale, 1 to SOCWA)

Water mains comprising the City's water system were primarily constructed in the 1920's, with a weighted average construction year of 1939, making roughly 70% of the pipes currently in service extending past their design life (80 years). Furthermore, 57% of the system is comprised of under-sized and

under-capacity, 6'' diameter cast iron water main. Fire demand, current water system regulations, and the findings of the Water Reliability Study will require undersized pipes to be upgraded as the minimum diameter for water main installation is eight (8) inches.

More recently, in 2018, the Michigan Department of Energy, Great Lakes and Environment (EGLE) revised their Lead and Copper Rules requiring communities to complete full replacement of lead and galvanized water services from the water main to at least 18 inches inside the building being served where these services exist. The City completed a preliminary inventory of their water services to identify material types in place based upon installation records and identified 825 lead or galvanized water services within the system. The City is required to replace a minimum of 5% of the lead water services over the next 20 years starting in 2021.

2.4 Project Need

The City of Pleasant Ridge is currently in compliance with all drinking water standards. There are currently no orders of enforcement in place for the City of Pleasant Ridge; however, the City's water distribution system is aging with several water mains nearing 100 years in age; well beyond its useful life.

In addition, concerns over meeting minimum capacity and reliability are present based upon the City's Water Reliability Study. This study is updated on a routine basis of five years or as required by EGLE. The study analyzes and evaluates the existing water distribution system with a pipe analysis program Pipe2014, by KyPipe LLC. In regards to minimum fire capacity, the report states, "Based on the model's output, it is immediately apparent the majority of the distribution system cannot provide the desired flow of 1,000 gpm at 20 psi to residential areas". "The primary factor impacting available fire flow appears to be the age of the water mains and the prevalence of 6-inch water mains". Improvements associated with this project would satisfy all identified reliability and looping deficiencies, by replacing all six-

inch water mains with eight-inch water mains, along with looping of the system at Indiana Avenue from E 10 Mile Road to Woodward Heights Boulevard and at Southbound Woodward Avenue from Oakland Park Boulevard to Elm Park Avenue. Refer to Appendix J for a visual of the anticipated reliability and looping benefits of this project.

Furthermore, lead water service replacement is required due to the new community requirements established in EGLE's revised Lead and Copper Rule. The Lead and Copper Rule enacted in June 2018 mandated new action levels for lead and copper based on a 90th percentile level of tap water samples. In Michigan, a State lead action Level of 15 parts per billion (ppb) was established and is expected to be decreased to 12 ppb. Along with this, new sampling requirements and methods were developed to improve lead detection in a community's drinking water. An action level exceedance is not a violation but triggers a set of requirements that must be completed to minimize exposure to lead and copper in drinking water. This includes water monitoring/treatment, public education, and lead service line replacement.

Due to the recent changes to lead service line replacements as part of the Lead and Copper Rule, the City is now required to replace all lead and galvanized water service lines affected by a water main replacement project and replace at least 5% of known lead water services each year over a period of 20 years. The cost of the entire lead water service replacements must be borne by the City starting in 2021. In addition, several water mains are undersized, not looped, and have surpassed their useful design life. Significant costs are anticipated based on the replacement needs and vast number of lead service lines.

Therefore, the City is seeking to apply for a DWSRF loan in the amount of $24,525,000 million dollars for water distribution system improvements. The system improvements would seek to address the items as included within the City's 20-Year Capital Improvement Plan, which is contained within the

approved Asset Management Plan. These improvements generally consist of replacing approximately 39,000 linear feet of 100-year old, 6" cast iron water main, and estimated 825 lead service lines (public and private portion) on twenty-one (21) streets within the City.

3.0 ANALYSIS OF ALTERNATIVES

3.1 Identification of Potential Alternatives

The City of Pleasant Ridge has analyzed different alternatives to address the replacement or addition of the aging and under-sized water distribution system and are summarized as follows:

A. No-Action

By allowing the water distribution system to continue operating in its current condition and not moving forward with improvements, the risk of water main failures will increase and the cost to maintain the water distribution system will greatly increase over time. In addition, there is a risk to the health and well-being of the users of the system if the system is not operated and maintained properly and with build-up of deposits within the water main over time, the capacity of the water main further diminishes along with adequate fire flow. Further, no action would result in continued use of water services containing lead or galvanized materials putting public health at risk and would not comply with Michigan's current Lead and Copper Rule and would not comply with the current drinking water standards and Safe Drinking Water Act 399 of 1976. For the water main replacements, this alternative will result in the potential for an unreliable water system in the future.

Therefore, based upon the information above, it is not the best alternative for the City to take "No Action" in improving the water distribution system.

B. Water Main Replacement by Open Cut Excavation

Historically, the majority of water main installation that has taken place in the City of Pleasant Ridge has been by the means of open cut excavation. New water mains were placed within the greenbelt (between the street and sidewalk) or under the sidewalk where feasible to avoid installing underneath the roadway. However, some existing water mains are currently located underneath the roadway. If a water main break occurs, the costs are significantly higher when the water main is directly underneath a roadway requiring a section of the roadway to be removed and replaced. This option would involve the placement of a new ductile iron water main by means of open cut trench excavation including the installation of new fire hydrants and gate valves. Existing copper water services would be transferred from the existing water main to the new water main within the City's right-of-way and lead and galvanized water services would be replaced in their entirety from the water main to at least 18 inches inside the building being served. Lead water services would be replaced by directional drilling from the right-of-way to the building. This option would require the replacement of all driveway approaches, sidewalk, and mature trees along one (1) side of the roadway to accommodate the new water main. The existing water main and lead and galvanized water services would be abandoned in place upon completion of construction.

C. Directional Drilling Installation

The preferred method for water main replacement is by means of directional drilling. This option is preferred for the preservation of established, matured trees and competitive pricing with the open-cut installation method. This option would involve the placement of a new water main by directional drilling the new water main for long sections along a street reducing the amount of open cut excavation required. However, excavations will still be required for the installation of new fire hydrants, gate valves and service connections to the new water main for the transfer or replacement of lead and galvanized water services. Lead water services would be replaced by directional drilling from the right-of-way to the

building. This option would require far less removal of concrete pavement and sidewalk; however, locations will have to be removed in front of each property to complete the water service transfer.

D. Pipe Bursting Replacement

The City has researched the alternative of pipe bursting existing water mains. This option would reduce the amount of excavation required on the project and would involve the placement of a new water main within the same location as the existing water main by bursting the existing water main as the new water main is installed. However, excavations will still be required for the installation of new fire hydrants, gate valves and service connections to the new water main for the transfer or replacement of lead and galvanized water services. Lead water services would be replaced by directional drilling from the right-of-way to the building. This option would require far less removal of concrete pavement and sidewalk. However, some of the existing water mains are located underneath the roadway and pipe bursting could cause damage or distress to the existing roadway due to ground disturbance underneath the pavement from pipe bursting, particularly for those water mains that would be upsized from a six (6) inch water main to an eight (8) inch water main. This option is a potential alternative; however, based upon a cost analysis proves to be at a much higher cost.

4.0 PRINCIPAL ALTERNATIVES

4.1 Monetary Evaluation

The following table provides an overall cost summary comparing the potential alternatives for water main replacement if the City were to replace all water mains within the project plan:

Alternative	Quantity	Unit	Unit Cost	Total
Open Cut	39,000	Feet	$655/Ft	$25,545,000
Directional Drill	39,000	Feet	$630/Ft	$24,525,000
Pipe Bursting	39,000	Feet	$755/Ft	$29,430,000

Inclusive to the overall costs for water main replacement, it is estimated, on average, that each known lead and galvanized water service will cost $5,250 to replace for the public side replacement only, and $7,925 for a total replacement. Therefore, based upon 825 total known services (550 expected to be total replacement and 275 to be public side only) that will remain in the system after 2022, this amount equates to $5,802,500 in 2022 dollars. All costs summarized include engineering, permits, construction administration, construction inspection, construction staking and layout, material testing and restoration of all sites.

The Present Worth Analysis includes adding the present worth of cost of replacement and the present worth of the yearly operation and maintenance costs. The City of Pleasant Ridge will not have a revenue or salvage value from a water treatment facility since it purchases its water from GLWA. Interest rates for the DWSRF loans have been posted on EGLE's website; therefore, an interest rate of 1.875 percent was used for a 20-year loan.

The sunk costs involved with this project consist of the effort involved with preparing this DWSRF project plan of approximately $18,500.

As the useful life of the water mains being installed and the water services being replaced is greater than 50 years, the salvage value is negligible. This project plan and the DWSRF loan is for a 20-year period; therefore, the useful life far surpasses the DWSRF planning period.

No costs were escalated in the present worth analysis as only energy costs and land value can be escalated in the monetary value per the requirements of EGLE.

No land value is associated with the proposed project as all work is proposed within the existing right-of-way, existing utility easements or proposed construction easements to install copper water service lines.

Mitigation costs involved with this project would be any costs associated with soil erosion and sedimentation control, traffic maintenance and control, audio-visual record of the construction site, and any other costs associated with maintaining access for residents and commercial businesses at all times during construction. These costs will be included in the bid prices received by potential contractors; therefore, mitigation costs do not need to be included in the present worth analysis.

PRESENT WORTH ANALYSIS SUMMARY

CITY OF PLEASANT RIDGE

		Alternative 1 Project		Alternative 2 Project		Alternative 3 Project	
		Open Cut Excavation Water Main		Directional Drill Water Main		Pipe Bursting Water Main	
	Life	Cost	Salvage	Cost	Salvage	Cost	Salvage
Pipes & Valves	50 yrs	$ 25,545,000.00	$ 15,327,000.00	$24,525,000.00	$14,715,000.00	$29,430,000.00	$17,658,000.00
Structures	40 yrs						
Equipment	20 yrs						
Total Construction Cost		$ 25,545,000.00		$24,525,000.00		$29,430,000.00	
Engineering and Contingencies		$ 4,853,550.00		$ 4,659,750.00		$ 5,591,700.00	
Easements and Land Acquistion							
Present Worth Estimated Capital Costs (2021)		$ 30,398,550.00		$29,184,750.00		$35,021,700.00	
Salvage Value at 20 Years			$ 15,327,000.00		$14,715,000.00		$17,658,000.00
Present Worth of Salvage Value (4.625% at 20 Years)			$ 6,205,085.03		$ 5,957,318.87		$ 7,148,782.64
Total Annual O&M Costs							
Present Worth of O&M Costs (4.625% at 20 Years)							
Total Present Worth of Project (Capital+O&M-Salvage)		$ 24,193,464.97		$23,227,431.13		$27,872,917.36	

It is anticipated that all water main improvements will be funded through a 20-year, 1.875 percent interest DWSRF loan. It is estimated that the total project cost (principal + interest) would amount to $29,429,040.00. User costs are discussed further in Section 5.6 of this project plan.

4.2 Environmental Evaluation

The environmental evaluation of this project is provided in greater detail in Section 6.0 of this project plan and the mitigation of environmental impacts presented in Section 7.0 of this project plan.

4.3 Staging Construction

Due to the size of the project, the proposed project would be implemented over a four (4) year period. It is possible that multiple crews could be working at different locations throughout the duration of the project. Any streets proposed for water main replacement would be coordinated with other utility companies to allow them the opportunity to improve or replace their facilities at the same time. Any necessary road improvements would also be coordinated at the same time.

4.4 Implementation and Public Participation

The City of Pleasant Ridge is ready, willing, and able to implement the selected alternative of directional drilling. There are no intergovernmental agreements required. The City will be able to fully manage the maintenance of the replaced water main and water service lines.

The City of Pleasant Ridge will accept comments and concerns from the general public during a 30-day public comment period that will commence after the review of this draft project plan. This project plan will be posted for public review during that 30-day period, and a discussion of the plan will be had at a public hearing. Public input and information regarding the public hearing, is discussed further in Section 8.0 of this project plan.

4.5 Technical Considerations

The principal alternative (directional drilling) will comply with EGLE's current Lead and Copper Rule and the State of Michigan Act 399 for Safe Drinking Water Standards and will be designed to meet the standard recommended guidelines established in the "Recommended Standards for Water Works" as published by the Great Lakes and Upper Mississippi Board of State and Provincial Public Health and Environmental Managers (10-States Standards).

A Drinking Water Asset Management Plan was completed in 2018 for the City of Pleasant Ridge in compliance with Part 12 of the Michigan Safe Drinking Water Act, 1976 PA 399, as Amended. A copy of the EGLE approval and report is included in Appendix B. In addition, the current Water Reliability and Master Plan is included in Appendix K.

4.6 Residuals

The City of Pleasant Ridge purchases water from GLWA through SOCWA; therefore, there are no residual treatment alternatives.

4.7 Contamination

Water main replacement will take place in the road right-of-way and utility easements, which are adjacent to several parcels that are included on the current EGLE RRD Facilities List (see copy of list in Appendix D). During preparation of contract documents, the potential impact of these facilities will be further investigated. Construction documents will include provisions in the contract documents related to the handling and disposal of suspected contaminated soils and groundwater, and precautions for workers and others who may be exposed to the contamination. The proposed work will not worsen any existing contamination that may be found. Any contaminated soils encountered during construction will be segregated, stockpiled, and protected until they can be properly disposed of, such as at a Type II landfill.

4.8 Proposed/Increased Water Withdrawals

No proposed or increased water withdrawals are proposed with this project.

5.0 SELECTED ALTERNATIVE

5.1 Description

The option to upgrade and replace water mains by directional drilling is the selected alternative as it is the most cost-effective solution and is the most logical alternative to meet the City's preservation of trees and accomplish the mandated removal of lead impacted water services and provide the required level of service for water main flow. The City of Pleasant Ridge is looking to apply for a $24,525,000 loan through the Drinking Water State Revolving Fund loan program to accomplish water main and lead service line replacements and additions. Water mains have been selected based upon the approved 20-Year Capital Improvement Plan provided as part of the City's Water Asset Management Plan in 2018 and based upon the age and size of the water main, location, number of lead and galvanized water services to be replaced. The proposed project consists of the replacement of water mains at 21 different locations throughout the City. Those existing water mains that are currently six (6) inches in diameter would be upsized to an eight (8) inch water main to meet firefighting demands and current water system design standards. Non-existent water mains on Indiana Avenue from the north city limit to the south city limit and on Southbound Woodward Avenue from Oakland Park Boulevard to Elm Park Avenue would be added for looping benefits. In addition, approximately 825 lead and galvanized water services would be replaced as part of this project exceeding the requirement of replacing a minimum of 5% of known lead and galvanized services in the system each year. A list of the water mains to be replaced along with their associated costs is included in Appendix H. A map of the water system highlighting the locations of water main replacements has been included in Appendix G.

5.2 Design Parameters

The material identification of all lead water service lines has determined 825 services that contain lead to be replaced within the City's water distribution network. The City estimates there are 7.5 miles (70%) of water main that are beyond the useful design life cycle and 6 miles (57%) of water main that are undersized.

Based upon a $24,525,00 loan, approximately 8.8 miles (82.5%) of water main will be replaced and approximately 825 (100%) lead water services replaced. Replacement of lead water services will be completed by means of directional drilling. All replaced water services will be Type K Seamless Copper tubing, compliant with lead-free regulations (NSF-372 and NSF-61G). All installations will be in accordance with the City of Pleasant Ridge, AWWA and MDOT construction standards. Replacements of water main will be completed by means of directional drilling. All replaced water main will be C-900 PVC pipe or approved equal. All installations will be in accordance with the City of Pleasant Ridge, AWWA and MDOT construction standards.

5.3 Maps

A map of the City of Pleasant Ridge's water system showing water source, transmission and distribution lines along with proposed water main replacement locations has been provided in Appendix G. Furthermore, maps illustrating the existing and proposed peak hour firefighting capabilities is included with Appendix J.

5.4 Schedule for Design and Construction

Preliminary planning for the project outlines that the proposed water main replacement will occur over a 4-year period. The following table provides a timeline for implementation for this project with approximately $6 million dollars of work completed each year.

Intent to Apply	January 2022
Formal Public Hearing	June 14, 2022
Project Plan Adoption	June 14, 2022
Submit DWRF Project Plan to EGLE	No Later than July 1, 2022
Receive Approval of Project Plan	August 2022
DWSRF Loan Awarded	March 2023
Construction Award (4 Yr Project)	April 2023
Construction Completed	November 2026

5.5 Cost Estimate

The total project cost is estimated at approximately $24,525,000. This includes costs for engineering, construction administration, construction inspection, construction surveying and layout, material testing, permits and restoration of the sites. With 1.875% interest over a 20-year loan period, the total amount in interest paid would be $4,904,040 for a grand total of $29,429,040. Annual payments of the loan would be $1,471,452.

5.6 User Costs

The City of Pleasant Ridge's Capital Improvement Plan has been approved as part of their Asset Management Plan. In Spring of 2021, the City Commission approved new water rates which resulted in an average 35% utility bill cost increase for residents in Fiscal Year 2021-22. In addition, the City has voted and approved a water infrastructure property tax in November 2021 for 3.5 mills. This millage and increased rates will provide initial funds for the City to complete the water infrastructure projects included with this Project Plan. Later rate increases shall be determined to meet the expenditure gap, if needed.

No of Customers: 1,147 customers

Existing Yearly Revenue from Water Millage: =Net Taxable Value / $1,000/mil x No. of mills = $179,450,590 N.T.V. / $1,000/mil x 1.6987 mills
= $304,833

Existing Yearly Budget for Water Capital within Rates: $608,000/yr

Straight-line 20-Year Revenue from Existing Sources: $18,256,660/20-yr

Straight-line 20-Year Revenue with 3% annual inflation increases: $24,530,000/20-yr

Remaining revenue to be collected: $4,899,040

Additional Cost to Customer/Year: $213.56/yr

Additional Cost to Customer/Month: $17.80/mo

5.7 Disadvantaged Community

A Disadvantaged Community Status Determination Worksheet was completed and submitted to EGLE for consideration. It has been determined by EGLE that the City of Pleasant Ridge is not classified as a Disadvantaged Community.

5.8 Ability to Implement the Selected Alternative

The City of Pleasant Ridge is familiar with the legal, technical, financial, and managerial aspects necessary to complete municipal utility improvements. The City has overseen the preparation of engineering plans, solicited bids, and supervised construction for many public improvement projects. The City has the staff and resources to manage all aspects of the proposed project.

6.0 ENVIRONMENTAL EVALUATION

The following section provides a comprehensive review and evaluation of potential impacts that may occur as a result of the selected alternative. Beneficial and adverse impacts for both the long and short term are discussed, as well as the direct and indirect impacts.

6.1 Long-Term Impacts

Beneficial, long term impacts of the proposed project are the following:

- Improve the quality of drinking water distributed to the residents and businesses of the City of Pleasant Ridge
- Improve the reliability of the water distribution network and increase fire flow requirements
- Replace aging drinking water system infrastructure and remove potential lead contaminants from the existing system
- Comply with the Safe Drinking Water Act 399 of 1976 and current Lead and Copper Rules
- Removal of potential lead contaminants from the drinking water supply reducing the risk of adverse health effects due to potential lead in the drinking water
- Reduce costs for continued maintenance by eliminating deteriorating water mains

No significant adverse long-term impacts have been identified.

6.2 Short-Term Impacts

The adverse short-term impacts of the selected alternative are typical of those that occur on any construction project including noise, dust, traffic disruption, soil erosion and temporary water service disruption. The contract documents will include provisions to reduce these impacts as much as possible.

The negative impacts of this project are only short term and include temporary inconvenience to the general public who reside or frequent businesses along the proposed routes.

Even though the short term impacts can be a nuisance to the general public, including noise pollution, air pollution, temporary road and driveway closures and

so forth, the long term impacts greatly exceed the short term impacts as the long term impacts are seen as positive, beneficial impacts improving the water distribution system, public health and the quality of life for residents and businesses along and adjacent to proposed mains and water services being replaced and will provide for greater reliability of the distribution system.

6.3 Direct Impacts

Direct Impacts to the environment are directly attributed to the construction and operation of the project. These impacts as they relate to Historical/Archeological/Tribal Resources, Water Quality, Land/Water Interface, Endangered Species, Agricultural Land, Social/Economic Impact and Construction/Operational Impact are discussed below:

A. Air Quality

During the course of construction, maintaining good air quality will be of importance for the safety and health of the citizens of Pleasant Ridge. There are no long-term impacts to air quality for this project; however, short term impacts will occur during construction. For areas involving excavation of the site, dust and particulate matter may enter the air as the ground is disturbed and either stockpiled or transferred to trucks to be hauled away. In addition, sand and stone materials being brought to the site and stockpiled for bedding and backfill material may also allow dust and particulates to enter the air when winds increase. Dust control methods such as water and/or brine will be used to keep dust to a minimum and the construction sites cleaned and swept on a regular basis.

Several pieces of equipment will be on site for the proposed project. As new water main is proposed for installation as directional drilling, at a minimum, an excavator, bore machine, loader and pickup trucks will be on site running throughout the day while work is taking place. All equipment on site during all phases of construction will produce emissions into the air.

B. Historical/Archeological/Tribal Resources

The proposed project will not impact existing structures in work areas and excavations will be limited within the road right-of-way and possibly near the building where a lead water service must be replaced. The areas requiring excavation have been previously disturbed during the initial installation of the water main, water service and building foundations. Therefore, it is not anticipated that any historic or archeological sites will be impacted by the construction of the proposed project. An application for SHPO Section 106 consultation will be submitted to the Michigan State Historic Preservation Office (SHPO) for review and approval during the design phase of the project.

In addition, all 14 Tribal Historic Preservation Offices (THPO) that have had influence in the past in Southeastern Michigan will be contacted to determine if any tribal historic sites or regional plans could be impacted by the proposed project.

C. Water Quality

The proposed project will eliminate the potential source of lead and will provide the residents with potable municipal drinking water which meets all current public drinking water standards.

The proposed project does not involve construction which will adversely impact the ground water.

D. Land/Water Interface

The existing groundwater within the City of Pleasant Ridge is typically identified to be several feet below the surface. There are no surface waters, natural or wild and scenic rivers or shorelines located in Pleasant Ridge.

As the groundwater depth is several feet below the ground surface and the new water main being installed approximately six (6) feet below the ground surface, it is not anticipated dewatering will be required.

The study area does not contain any wetland areas as all work is proposed in built-out residential and commercial areas of the City. The study area is not within a floodplain area.

The study area is not within a coastal zone due to the distance from the shoreline of Lake Saint Clair. Therefore, the project will have no direct effect on the Coastal Barrier Resources System.

E. Endangered Species

According to the USFWS Species List generated on March 30, 2022 for the City of Pleasant Ridge boundaries, the Indiana Bat, Northern Long-eared Bat, Eastern Massasauga Snake, Rayed Bean, Snuffbox Mussel, Monarch Butterfly and Ooweshiek Skipperling are threatened, endangered or candidate species which may be found within the City of Pleasant Ridge. There are no known bat hibernacula or roosts within the City limits. There is no suitable habitat for mammals, birds, reptiles, clams or plants as the project will take place in developed, regularly mowed and maintained vegetative locations or paved locations. Correspondence was also provided to the Michigan Natural Features Index to identify any threatened or endangered species within the City limits.

Excavations for the replacement of water mains will be primarily located within the existing right-of-way and at the curb box adjacent to the right-of-way line. Based upon the research completed and the reasons outlined above, it has been concluded that the proposed City of Pleasant Ridge DWSRF Project Plan project will have "no effect" on listed species, their habitats, or proposed or designated critical habitat. A copy of the species list generated on March 30, 2022 from the USFWS IaPC website can be found in Appendix F.

F. Agricultural Land

The City of Pleasant Ridge is predominately residential, excluding commercial areas located along Woodward Avenue. Therefore, the project will have no direct effect on any agricultural systems.

G. Social/Economic Impact

The negative health impacts of exposure to lead, especially to children, are well known. There are emotional and community benefits to removing the lead containing water services such as reducing anxiety, improving gastrointestinal health and brain development and quality of life.

H. Construction/Operational Impact

The proposed work for the project is generally limited to the public right-of-way where streets may be impacted depending on the location of the existing and proposed water main. All components of the project will be coordinated with residences and businesses, and construction methods will be selected to minimize disruptions. Standard traffic and safety control devices meeting MDOT construction standards such as barricades and lighted barrels will be in place to warn and protect residents during construction activities.

Where water main replacement work is taking place within or near road right-of-way's, roads may have to be partially or completely closed to vehicular and/or pedestrian traffic. In addition, construction equipment and vehicles will have to be parked within the road right-of-way for a specified period of time.

Special consideration will have to take place with road closures, barricading of the site and cleanliness of the site when working in the vicinity of a school. In addition, revised routing of school buses and pedestrian traffic to school will have to be addressed.

Special considerations will have to take place with road closures, drive approach closures and parking lot entrance closures, barricading of the site and cleanliness of the site when working in front of or adjacent to a business to prevent any loss of business to the establishment during the course of construction and to provide a safe route to the business. Temporary access may be needed for certain businesses during construction.

Closures may result in the re-routing or postponement of garbage pick-up, mail delivery, parcel delivery and other deliveries to residences and businesses. Access for emergency vehicles and access for handicapped or disabled persons will also need attention.

Consideration must be taken to establish haul routes that impact the least amount of residents and businesses. Construction truck traffic will be confined to the construction project itself and accessing the sites from major roads only. No truck traffic will be allowed to be on adjacent residential streets.

During the replacement of the water service line, there will be a brief period when service is interrupted to a residence or business serviced by the water service lead. Home and business owners will be notified at least 48 hours in advance of any water shut offs.

To complete lead water service replacements from the water main to the meter inside the home, the City will have to gain access to private property and enter all structures to make the connection of the new water service to the existing plumbing within the structure. A waiver will have to be signed by the property owner to allow this work to take place on private property.

During the course of construction, the noise level will be increased with the amount of equipment on site and power tools being used. Truck traffic, at times, can be continuous hauling material in and out of the job site throughout the day.

Where open cut excavations will take place, special attention will be required when stockpiling excavated materials in addition to other material stockpiles and their locations to not interfere with existing drainage patterns and transfer particulates into the drainage system. Soil erosion and sedimentation control measures such as but not limited to silt sacks, filter fabrics and straw bales will be installed at storm water facilities as part of the construction activities to prevent soil release and protect nearby streams and wetlands in adjacent communities.

The vegetation to be disturbed for this project are grass areas maintained by each property owner. Any disturbed area will be replaced with topsoil, seed and mulch or topsoil and sod. Tree removal is not anticipated, but may be necessary. Any miscellaneous tree removal will be replaced with a tree of compatible species native to the area.

During construction of replacement water services and connection to home water systems, connection to the municipal system will be made as quickly as possible to reduce any inconvenience. The contract documents will require the contractor to coordinate service shut off and turn on with the property owner.

Lead service line replacements will take place in the road right-of-way and utility easements, which have been previously disturbed during the initial service line and water main installations. Any contamination encountered during construction will be remediated by the contractor. A copy of the EGLE RRD Facilities inventory for the area can be found in Appendix D.

6.4 Indirect Impacts

It is not expected that the water main replacements or lead water service replacements will spur growth within the City. Changes to natural areas, sensitive species, and ecosystem due to secondary growth because of the project are not expected. The project includes underground construction and will have minimal impacts during construction. It is not expected that there will be lasting impacts

on aesthetics, land use, density, or resource consumption over the useful life of the project.

Indirect impacts to wetlands, floodplains and water quality will be nonexistent during the construction activity and after completion of the project.

However, by providing looping within the system; as noted on Indiana Avenue from E 10 Mile Road to Woodward Heights Boulevard and on SB Woodward Avenue from Elm Park to Oakland Park Boulevard, and also upsizing undersized 6-inch water mains, the City expects to provide a minimum fire flow of 1,000 gpm at 20 psi. This flow and pressure will adhere and exceed to the minimum requirements of the State Insurance Services Office. So, in future firefighting events, there will be a measurable difference in the ability to effectively fight fires, resulting in improved economic benefits, further protection of property, valuables and life.

7.0 MITIGATION MEASURES

This section describes measures that can be used to mitigate adverse impacts on the environment; both structural and non-structural measures that will be taken to avoid, eliminate or mitigate an adverse impact are discussed below.

7.1 Short-Term Impacts

All short-term impacts of the selected alternative are related to construction activities and the following provides mitigation efforts for these impacts:

A. Air Quality

Where open cut excavation of the site takes place, dust and particulate matter may enter the air as the ground is disturbed and either stockpiled or transferred to trucks to be hauled away. In addition, sand and stone materials being brought to the site and stockpiled for bedding and backfill material may also allow dust and particulates to enter the air when winds increase. To control the amount of dust

and particulates entering the atmosphere from a construction site, the following efforts will be made:

- Stockpiling of backfill materials should be kept to a minimum and should not be onsite for an extended period of time.
- Stockpiles shall be placed well away from catch basins and manholes.
- Excavated material shall be stockpiled neatly and well away from catch basins and manholes and should be hauled away by trucks to appropriate dumping sites or landfills at the Contractor's discretion as soon as possible.
- Any contaminated soils encountered shall be properly stockpiled and covered until the appropriate landfill allows for the dumping of this material through a manifest.
- Silt fencing shall be placed around the perimeter of all construction sites to prevent soil erosion and silt sacks or filter fabrics placed in all catch basins and any manhole covers with perforated lids to prevent sedimentation entering the sewer system.

B. Archeological, Historical and Culturally Significant Resources

The City of Pleasant Ridge will submit a State Historical Preservation Office (Section 106) Application. Furthermore, the City will submit requests to all 14 tribal agencies throughout the State of Michigan to obtain information about any historical or cultural significance known that may impact the proposed construction. It is not anticipated any historical or cultural resources will be impacted by the proposed project. However, if archeological, historical or culturally significant artifacts are uncovered during excavations all work will be stopped and the State Historical Preservation Office and any tribal organizations with influence in the area will be contacted to come to the site and identify the artifacts and determine if additional artifacts may be uncovered. The State Historical Preservation Office and tribal organizations will be allowed to obtain the artifacts and direct us on how to proceed with construction.

C. Groundwater and Surface Waters

Dewatering is not expected for the proposed project, as the groundwater level will be greater than the anticipated depth for water main installation. However, if groundwater is encountered, groundwater will be pumped out of the excavation, treated through necessary filters and discharged into the existing sewer system not allowing any silt or sediment into the sewer system.

For those locations involving excavations, all necessary soil erosion and sedimentation control measures will be put in place. These measures include:

- Silt fence along the grading limits of the project. Silt fence will be trenched in at least 6 inches into the ground to prevent any sedimentation from leaving the construction site.
- Silt sacks will be placed in all catch basins and perforated manholes within the grading limits and in all adjacent structures to the construction site to prevent silt and sedimentation from directly entering the sewer system.
- Stockpiles will be kept neat at all times and if necessary silt fence or erosion eels placed around the perimeter.
- Adjacent streets and haul routes will be swept cleaned on a regular basis to prevent the tracking of silt and sedimentation away from the construction site. Water will be used to spray the streets prior to being swept to mitigate dust control.

The City purchases its water from GLWA through SOCWA, and as regulated under the Safe Drinking Water Act, source water protection has been considered. A surface water protection plan has been developed by the GLWA and the City of Pleasant Ridge has adopted this plan as their own to best mitigate and protect source waters. A copy of this plan can be found in Appendix I.

D. Endangered Species

The City of Pleasant Ridge has submitted correspondence to the United States Fish and Wildlife Service, the Michigan Natural Features Index and the Michigan Department of Environment, Great Lakes and Energy (EGLE) to identify any endangered species that may exist within the City that may be impacted during construction and to identify any floodplains or wetlands within the City. Furthermore, the City has researched current Federal Emergency Management Agency floodplain maps for Oakland County and consulted recent wetlands inventories to identify existing wetlands and floodplains. It does not appear based upon the information compiled that any of the proposed work will take place in a designated floodplain or wetland. No surface waters exist in the City of Pleasant Ridge. In addition, no agricultural lands exist within the City of Pleasant Ridge.

However, if endangered species are encountered, all work for that particular project will be stopped until further notice so that the City can consult with the United States Fish and Wildlife Service and EGLE to identify alternative solutions to construct the proposed project without interruption or destroying an endangered species habitat.

E. Construction Impact

The largest impact of the proposed project is the short-term inconvenience to the general public and to commercial businesses within the City. The proposed project will create several short-term inconveniences to the general public.

During the course of construction, heavy equipment will be operating continuously during the work day. In addition, several power tools, generators and potentially dewatering pumps could be running continuously throughout the work day. The City has an ordinance in place that will allow the Contractor to only operate during the hours of 7am and 730pm Monday through Saturday. Sunday work within the same time frame may be approved by the City administration if

deemed warranted. These scheduling restrictions are in place to allow residents quiet time when they are primarily expected to be home.

It is not anticipated full closures of streets will be required. Lane closures may take place briefly and traffic control signage will be placed upon entering the construction site per the current manual of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD). Construction sites will be properly barricaded to not allow vehicular or pedestrian traffic into the construction site.

For any projects adjacent or nearby a school, the sites will be properly barricaded to prevent pedestrian traffic from entering the construction site. Detour signs will be placed for pedestrian traffic to schools if warranted.

For school bus routing, the contractor will be required to contact the local school district to coordinate the re-routing of buses if necessary and relocate bus stops within the construction site away from the construction site. The Contractor, City and local school district will work cooperatively to inform residents of any changes to bus stops with several days' notice.

Driveways and pedestrian access to businesses will be provided at all times. It is not anticipated that any of the proposed work will affect the access to any local businesses.

Mail and parcel delivery service will be provided to residents and businesses at all times. Garbage collection will be picked-up as normal during construction. The Contractor may be required to move refuse at the beginning of the day to allow for pick up.

During the connection of the new water main to the existing water distribution system and for the replacement of water services, there will be a temporary loss of water service. The loss of water service should be no greater than one (1) working day. Notices to residents and business owners affected with temporary

loss of service will be passed out 48 hours prior to construction, letting citizens know of the upcoming interruption.

Driveway access will be provided as much as possible. There may be brief periods of time where driveways will not be accessible, particularly if a water service is located underneath a driveway or within close proximity. Following water main or service installation, the trench will be backfilled and maintenance aggregate placed temporarily to allow for access until a new driveway approach is poured. If concrete driveway approaches are replaced and concrete poured, the concrete must cure for a minimum of five (5) days. Residents whose driveways are inaccessible for a brief period of time will be required to park on side streets.

Emergency access will be provided at all times for fire and rescue apparatus. During non-working hours all equipment will placed off to the side of a construction site to allow for through access. In addition, those residents that are disabled or handicapped that need direct access to their homes will be provide special access.

The Contractor will be required to keep the construction site as clean and neat as possible. The Contractor will be asked to sweep clean the adjacent streets to the construction site on a regular basis, provide access as much as possible at all times and backfill trenches as much as possible at the end of every day. Stockpiling will be kept to a minimum.

F. Operational Impact

During the operations of construction projects, the most important concern is obviously the safety of the construction workers and the safety of nearby residents and businesses. The Contractor for these projects will be required to follow safety procedures per the Occupational Safety and Health Administration (OSHA) and provide the City and City's consultant engineer with a Contractor's Safety Program. The Contractor's will also have to be bonded and insured. The City and the Engineer will not be responsible as the safety officer for the site; however, shall

make note of any unsafe conditions and immediately report to the Contractor. The Contractor will be responsible for safety and name a safety officer for the site responsible for all safety issues that arise. The Contractor will be responsible to provide safety training regularly during the course of construction.

If a chemical spill were to occur, all construction shall be stopped and the chemicals cleaned up appropriately. If the chemical poses a dangerous threat to the public, the fire department shall be immediately called to the site.

If a vehicular accident occurs within the construction site, police and fire shall be called immediately to assist and provide a police report of the incident.

The Contractor will be required to call MISS DIG or 811 to mark all underground utilities three (3) business days prior to starting construction. Where underground utilities exist, the Contractor will be required to hand dig to expose the utility prior to excavation with equipment.

If a gas main is damaged during the excavation, the fire department shall be immediately called to the site and the local gas company immediately called to assess the situation and have repaired. All work must come to a stop and all equipment shut off when a gas main is damaged. If a large main is damaged, the construction site shall be evacuated.

If a water main is damaged during the excavation, the Contractor will be immediately directed to shut off the water main at the next nearest gate valves and to perform the necessary repairs. All work shall be stopped until the water main is repaired.

The Contractor will be responsible for all costs incurred to damaged utilities that were marked by MISS DIG or 811.

If MISS DIG marks begin to fade away or disappear during the course of construction, the Contractor will be responsible to have MISS DIG re-stake the

utilities. Markings are typically only good for 21 days; therefore, they may need to be re-staked at time for the duration of construction.

Any serious injuries that take place during construction operations shall immediately be reported and the fire department contacted to provide a rescue unit.

7.2 Long-Term Impacts

There are no anticipated long-term impacts to mitigate from the proposed project.

7.3 Indirect Impacts

There are no expected indirect impacts that require mitigation for this project.

8.0 PUBLIC PARTICIPATION

8.1. Public Meeting on Proposed Alternatives

No public meetings were conducted regarding this draft project plan. However, a formal public hearing will be held at a later specified date. This draft project plan and notice to the public will be posted at a minimum 30-days in advance.

City officials were continually updated as to the progress of developing this project plan and proposed work to be incorporated into the project plan. Furthermore, the general concept of the planned projects was shared with the City during the Fall 2021 City Water Infrastructure Millage. Two town hall meetings were held in 2021, March and October, in regards to the discussion of the Water Infrastructure Millage, which included the general concept of this project plan. In addition, as a result of the millage discussion, a Citizens Advisory Committee was comprised, and met from January through April 2022. The objective of this committee was to study and recommend the best funding method to implement

the Water Infrastructure Projects (20 Year CIP). This committee recommended pursuing a DWSRF low interest loan to the City Commission, and as a result this draft project plan is being submitted with support and at the request of the City Commission.

8.2. Public Hearing on Selected Alternative

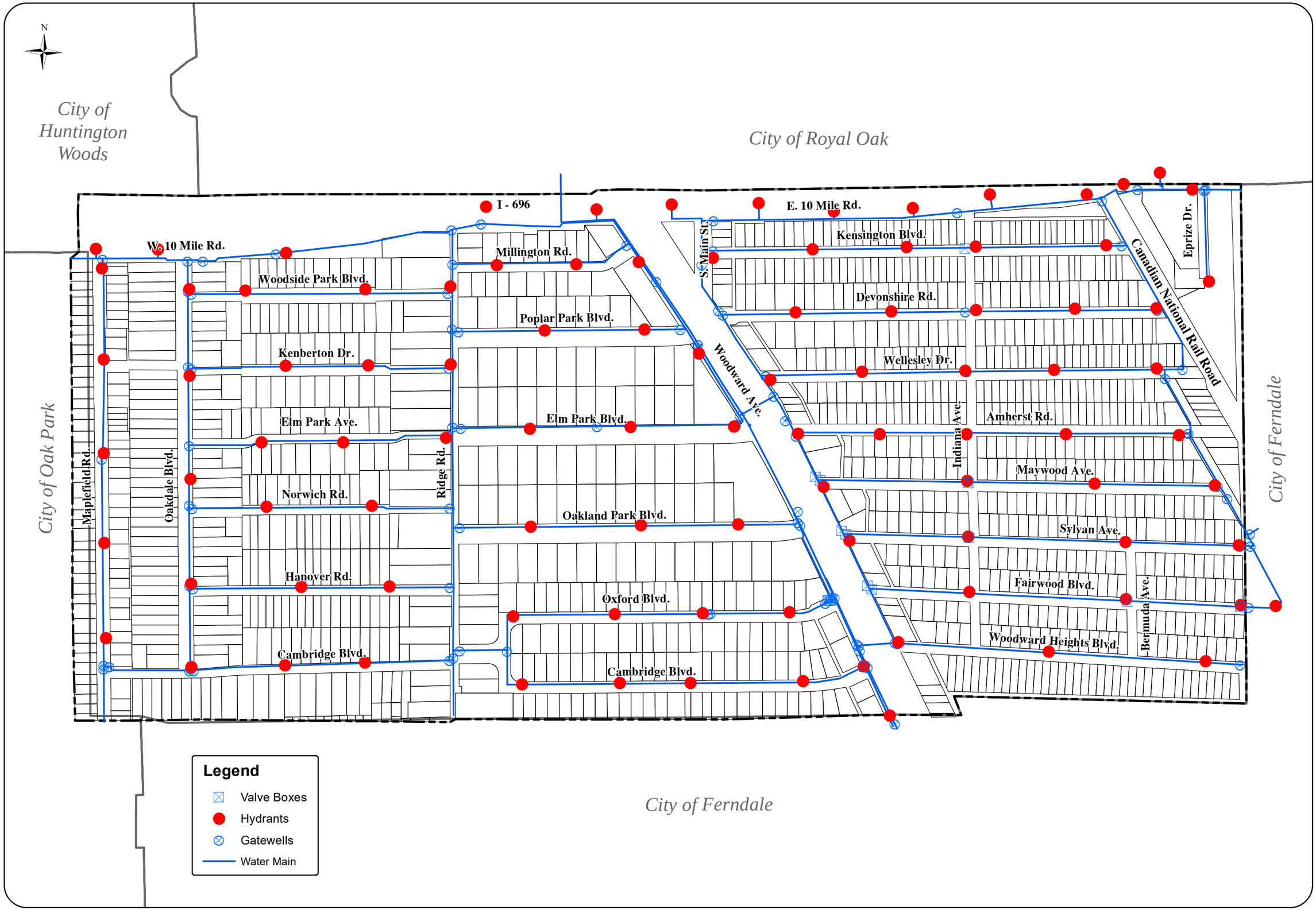
Per the requirements of EGLE, a formal public hearing will be held and conducted during a regularly scheduled City of Pleasant Ridge City Commission Meeting. The public hearing will allow the City Commission, City officials and the general public an opportunity to provide input and/or comments regarding the proposed DWSRF project. A notice for the public hearing will be published in the local newspaper and on the City's website to allow for a minimum 30-day public comment period. The public comment period will allow for input and/or comments from the general public prior to the public hearing and to allow the general public to review the draft DWSRF project plan available for viewing at City Hall in the City Manager's Office. A copy of the advertisement and affidavit acknowledging the publishing of the advertisement will be provided in the final project plan.

8.3 Adoption of Project Plan

After closing of the future public hearing portion of the commission meeting, the City of Pleasant Ridge shall pass a resolution adopting the Project Plan and naming a designated representative to authorize all activity to related to this project.

APPENDIX A

City of Pleasant Ridge Water Distribution Map



REFERENCE SHEET NUMBER
BASEMAP

CAUTION

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City of Pleasant Ridge

OVERALL WATER MAIN MAP

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS
51301 SCHOENHERR RD. SHELBY TOWNSHIP, MI. 48315
www.aewinc.com p(586)726-1234

PLOT DATE:	MAY 4, 2022	DRAWING DATE:	SEPTEMBER 9, 2019
PLOT SCALE:	NTS	DRAWING SCALE:	NTS
PLOT CONFIG:	11 x 17	PROJECT NO:	0175-0120
ATTACH XREF:	NONE	DRAWING FILE:	OverallWaterMain.mxd
		DRAWN BY:	JMM
		CHECKED BY:	BM

N

I - 696

W. 10 Mile Rd.

E. 10 Mile Rd.

Millington Rd.

S. Main St.

Woodside Park Blvd.

Kensington Blvd.

Eprize Dr.

Poplar Park Blvd.

Devonshire Rd.

CANADIAN NATIONAL RAILROAD

Kenberton Dr.

Woodward Ave.

Wellesley Dr.

Elm Park Blvd.

Amherst Rd.

Elm Park Ave.

Maplefield Rd.

Oakdale Blvd.

Ridge Rd.

Indiana Ave.

Maywood Ave.

Norwich Rd.

Oakland Park Blvd.

Sylvan Ave.

Bermuda Ave.

Hanover Rd.

Fairwood Blvd.

Oxford Blvd.

Woodward Heights Blvd.

Cambridge Blvd.

Cambridge Blvd.

Legend

- 6" Main
- 8" Main
- 10" Main
- 12" Main
- 30" SOCWA Main

REFERENCE SHEET NUMBER
BASEMAP

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City of Pleasant Ridge

WATER MAIN DIAMETER SUMMARY

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PLOT DATE:	MAY 4, 2022	DRAWING DATE:	MAY 4, 2022
PLOT SCALE:	NTS	DRAWING SCALE:	NTS
PLOT CONFIG:	11 x 17	PROJECT NO:	0175 - 0128
ATTACH XREF:	NONE	DRAWING FILE:	MainSize.mxd
		DRAWN BY:	JGS
		CHECKED BY:	BM

APPENDIX B

City of Pleasant Ridge Drinking Water Asset Management Plan

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
WARREN DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

January 29, 2021

Mr. James Breuckman
City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

WSSN: 05390

Dear Mr. Breuckman:

SUBJECT: Asset Management Program Approval for Pleasant Ridge

Pleasant Ridge's revised Asset Management Program (AMP) was received by our office on January 21, 2021, via email. We have reviewed the AMP and find that the content adequately addresses the current requirements outlined in R 325.11606 of the Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). **The AMP is hereby approved for that set of requirements.** This approval does not apply for establishing an alternate lead service line replacement schedule or the requirement to add the presence of lead service lines as a factor in prioritizing asset criticality.

The submittal provided to the Department of Environment, Great Lakes, and Energy (EGLE) is only a summary of the data the water system has and actions it intends to undertake. During future visits, EGLE will discuss the implementation of the AMP with you and look at the data you have assembled.

Although the AMP is currently sufficient, there are additional considerations for the future:

- Michigan's Lead and Copper Rule recognizes the benefits of addressing lead service lines through the water system's AMP. Greater flexibility in lead service line replacement is afforded to supplies that incorporate lead service lines into their AMPs. You are encouraged to include lead service lines in your asset inventory and capital improvement plan if you have not already.

If you have any questions, please contact me at by phone at 248-504-9142; by email at Islama@michigan.gov; or by mail at EGLE, DWEHD, Warren District Office, at the address provided on this letterhead.

Sincerely,

Abuzoha Islam, District Engineer
Field Operations Section
Drinking Water and Environmental Health Division

cc. Mr. Brett McDonald, Anderson, Eckstein and Westrick, Inc.
Mr. Bob Jackovich, SOCWA
Ms. Kris Donaldson, EGLE

WATER SYSTEM ASSET MANAGEMENT PLAN

Prepared for

City of Pleasant Ridge

First Submitted: April 2018
Revision No. 1 (per EGLE): January 21, 2021

AEW Project No. 0175-0120

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EXECUTIVE SUMMARY

Rule 1606 of Michigan Public Act 399 states that, "A community water supply that serves more than 1,000 people shall implement an asset management program…beginning January 1, 2018". In addition, Section 325 of Michigan Public Act 399 states that, "Water supplies with lead service lines, regardless of lead action level values, must replace all lead service lines at an average rate of 5 percent per year (starting in 2021), not to exceed 20 years, or in accordance with an alternate schedule incorporated into an asset management plan and approved by EGLE." In order to fulfill the requirements, set forth in Public Act 399, the City of Pleasant Ridge has requested an asset management plan be prepared by Anderson, Eckstein and Westrick, Inc. (AEW).

The purpose of this asset management plan is to identify major drinking water system assets owned by the City of Pleasant Ridge, establish a baseline condition of the assets, estimate remaining life of the assets and estimate annual maintenance, repair and replacement costs of the assets.

The City of Pleasant Ridge, located near I-696 and M-1 in Oakland County, owns and operates a water distribution system, which serves the City of Pleasant Ridge. The City consists of 1,147 customers, and their customer demographics are 98% residential and 2% commercial.

The City's assets include 11 miles of drinking water distribution pipes, 104 distribution isolation valves, 97 fire hydrants, and 1,149 water service lines. The City operates on an annual O&M budget of $150,000.

The results highlighted below are intended to provide the City with a formal approach for estimating the amount of capital dollars to budget in order to maintain the assets owned by the City and comply with Act 399.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is shown in Table 1. This is an EGLE alternate, 30-year plan and will be updated every year when the budget is completed. The complete Asset Management Plan summarizing the calculations used to make this determination is attached. Also summarized in the engineering report, is an inventory of the assets, baseline condition of the assets, and a detailed recommendation for the capital dollars.

Table 1. Capital Improvement Plan

Fiscal Year	Capital Project(s)	No. of LSLs to be replaced with Capital Project(s)	Planned Capital Project Costs	Anticipated Capital Budget (Depreciation + Normal Capital + LSL)	Balance - Utility Fund
2021-22	Elm Park Blvd & Maplefied & Millington & NB Woodward - LSL Replacement Only[3]	21	$ 73,500.00	$ 800,000.00	$ 726,500.00
2022-23	Operating Transfer In - Capital		$ -	$ 300,000.00	$ 1,026,500.00
2022-23	Kensington - Full WM Reconstruct	74	$ 1,581,200.00	$ 800,000.00	$ 245,300.00
2023-24	Nothing	0	$ -	$ 800,000.00	$ 1,045,300.00
2024-25	Oakdale - Full WM Reconstruct	56	$ 1,572,200.00	$ 800,000.00	$ 273,100.00
2025-26	Nothing	0	$ -	$ 800,000.00	$ 1,073,100.00
2026-27	Wellesley - Full WM Reconstruct	66	$ 1,602,400.00	$ 800,000.00	$ 270,700.00
2027-28	Nothing	0	$ -	$ 800,000.00	$ 1,070,700.00
2028-29	Indiana - New WM Reconstruct & SB Woodward, Elm Park to Oakland Park	N/A	$ 1,368,280.00	$ 800,000.00	$ 502,420.00
2029-30	Woodward Heights Blvd - Full WM Reconstruct	38	$ 1,280,000.00	$ 800,000.00	$ 22,420.00
2030-31	Nothing	0	$ -	$ 800,000.00	$ 822,420.00
2031-32	Amherst - Full WM Reconstruct	38	$ 1,413,700.00	$ 800,000.00	$ 208,720.00
2032-33	Nothing	0	$ -	$ 800,000.00	$ 1,008,720.00
2033-34	Fairwood Blvd - Full WM Reconstruct	49	$ 1,321,700.00	$ 800,000.00	$ 487,020.00
2034-35	Nothing	0	$ -	$ 800,000.00	$ 1,287,020.00
2035-36	Sylvan Ave - Full WM Reconstruct	50	$ 1,376,300.00	$ 800,000.00	$ 710,720.00
2036-37	Poplar Park - Full WM Reconstruct	17	$ 676,500.00	$ 800,000.00	$ 834,220.00
2037-38	Woodside Park - Full WM Reconstruct	26	$ 786,900.00	$ 800,000.00	$ 847,320.00
2038-39	Devonshire - Full WM Reconstruct	45	$ 1,505,400.00	$ 800,000.00	$ 141,920.00
2039-40	Nothing	0	$ -	$ 800,000.00	$ 941,920.00
2040-41	Maywood Ave - Full WM Reconstruct	50	$ 1,412,000.00	$ 800,000.00	$ 329,920.00
2041-42	Nothing	0	$ -	$ 800,000.00	$ 1,129,920.00
2042-43	Kenberton & Elm Park Ave - Full WM Reconstruct	21	$ 1,387,500.00	$ 800,000.00	$ 542,420.00
2043-44	Hanover - Full WM Reconstruct	27	$ 808,200.00	$ 800,000.00	$ 534,220.00
2044-45	Norwich - Full WM Reconstruct	22	$ 772,100.00	$ 800,000.00	$ 562,120.00
2045-46	Cambridge Blvd (Maplefied to Ridge) - Full WM Reconstruct	26	$ 990,100.00	$ 800,000.00	$ 372,020.00
2046-47	Nothing	0	$ -	$ 800,000.00	$ 1,172,020.00
2047-48	Cambridge Blvd (Ridge to Woodward) - Full WM Reconstruct	24	$ 1,272,600.00	$ 800,000.00	$ 699,420.00
2048-49	Oakland Park - Full WM Reconstruct	17	$ 916,000.00	$ 800,000.00	$ 583,420.00
2049-50	Ridge - Full WM Reconstruct	18	$ 1,202,700.00	$ 800,000.00	$ 180,720.00
2050-51	Nothing	0	$ -	$ 800,000.00	$ 980,720.00
2051-52	Oxford - Full WM Reconstruct	15	$ 1,189,100.00	$ 800,000.00	$ 591,620.00
Total		**700**	**$24,508,380.00**	**$ 25,100,000.00**	**$ 591,620.00**

Note(s): 1) Project Costs and Anticipated Capital Budget are in today's dollars. It is assumed that inflation of project costs will be offset by rate increases. **2)** A Capital Project is defined as a project with a cost of more than $10,000 and having a useful life of at least 3 years. 3)Only private side of service needs to be replaced. Estimated cost is $3,500/private service line.

Table 2. Lead Service Line Replacement Schedule

Year	Required No. of LSL's to be replaced	Required cumulative No. of LSL's to be replaced	No. of LSLs to be replaced per CIP	Cumulative No. of LSL's to be replaced per CIP	Difference
1	22	22	21	21	-1
2	23	45	74	95	50
3	22	67	0	95	28
4	23	90	56	151	61
5	22	112	0	151	39
6	23	135	66	217	82
7	22	157	0	217	60
8	23	180	0	217	37
9	22	202	38	255	53
10	24	226	0	255	29
11	22	248	38	293	45
12	23	271	0	293	22
13	22	293	49	342	49
14	23	316	0	342	26
15	22	338	50	392	54
16	23	361	17	409	48
17	22	383	26	435	52
18	23	406	45	480	74
19	22	428	0	480	52
20	24	452	50	530	78
21	22	474	0	530	56
22	23	497	21	551	54
23	22	519	27	578	59
24	23	542	22	600	58
25	22	564	26	626	62
26	23	587	0	626	39
27	22	609	24	650	41
28	23	632	17	667	35
29	22	654	18	685	31
30	24	678	0	685	7
31	22	700	15	700	0

Water Rate Methodology

An EGLE alternate, 30-year capital improvement plan has been put forth, above. With the approval of this water asset management plan, it will be City Commission's responsibility to fund the plan. The following rate analysis displays the revenue deficit that would need to be collected, Table 3, and the anticipated subsequent water rate increases, Table 4.

Table 3. Proposed FYE 2022 Water Rate Methodology

	Historical		Current	FY 2021-22
	FY 2018-19	FY 2019-20	FY 2020-21	30 Year LSL Plan
EXPENDITURES				
Water Purchase Needs (GLWA/SOCWA)				
Variable Cost	$ 185,438.08	$ 169,549.40	$ 174,454.11	$ 178,752.00
Fixed Cost	$ 19,536.00	$ 20,892.00	$ 20,376.00	$ 19,680.00
Total Water Purchase Needs	$ 204,974.08	$ 190,441.40	$ 194,830.11	$ 198,432.00
Operations and Maintenance				
Internal labor	$ 78,107.00	$ 58,831.00	$ 59,000.00	$ 70,000.00
Supplies & services	$ 89,069.00	$ 86,018.00	$ 90,000.00	$ 100,500.00
Total Operations and Maintenance Needs	$ 167,176.00	$ 144,849.00	$ 149,000.00	$ 170,500.00
Total Water Purchase and Operating Needs	$ 372,150.08	$ 335,290.40	$ 343,830.11	$ 368,932.00
Capital and Other Needs				
Depreciation	$ 141,387.00	$ 142,500.00	$ 143,000.00	$ 145,000.00
Capital Projects - see CIP Table	$ 60,000.00	$ 25,000.00	$ 25,000.00	$ 421,666.67
SDWA Act 399 (LSL) - Capital Projects				$ 233,333.33
Total Capital and Other Needs	$ 201,387.00	$ 167,500.00	$ 168,000.00	$ 800,000.00
Total Water Expenses	$ 573,537.08	$ 502,790.40	$ 511,830.11	$ 1,168,932.00
REVENUES				
Volumes (mcf)				
Water Purchased from GLWA/SOCWA Volume	12,136.00	10,820.00	11,133.00	11,200.00
Water Sale Volume to Pleasant Ridge Users	10,092.45	9,301.98	9,387.40	9,400.00
System Water Loss	17%	14%	16%	16%
Consumption Charge Rate	$ 41.25	$ 41.25	$ 44.00	$ 44.00
Consumption Charge Revenue (Water Sold x Rate)	$ 416,313.56	$ 383,706.68	$ 413,045.60	$ 413,600.00
Ready-to-Serve Charge Revenue*	$ 216,119.32	$ 228,282.17	$ 296,133.42	$ 296,133.42
Penalties & Interest	$ 18,674.00	$ 19,645.00	$ 19,500.00	$ 19,500.00
Total Water Revenues	$ 651,106.88	$ 631,633.85	$ 728,679.02	$ 729,233.42
Over/(under) Revenue Requirements	$ 77,569.80	$ 128,843.45	$ 216,848.91	$ (439,698.58)
Required Revenue Increase Percentage - From FYE 21				60%

Table 4. Water Rate Comparison. Pleasant Ridge vs. SOCWA Community.

Community	2019 Water Rate/REU
FYE 22 Pleasant Ridge - 30 Yr LSL Plan	**$171 - $179**
Huntington Woods	$ 135.75
Southfield	$ 124.59
Lathrup Village	$ 124.30
Royal Oak	$ 120.10
Clawson	$ 113.96
SOCWA Average	**$ 109.70**
Birmingham	$ 108.73
2019 Pleasant Ridge	**$ 106.77**
Beverly Hills	$ 105.96
Berkley	$ 105.76

1.0 STUDY BACKGROUND AND PURPOSE

A utility system is comprised of several assets, as the system ages and deteriorates, incidental costs are likely to occur. These unforeseen costs include: level of service, operation costs, maintenance costs, and replacement costs. An approach to managing these aging assets is defined as asset management. The International Infrastructure Management Manual defines the goal of asset management;

> "Meeting a desired level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers."

The intent of the asset management plan is to ensure long-term funding strategies in order to preserve the longevity of the City's assets.

2.0 INTRODUCTION

Rule 1606 of Michigan Public Act 399 states that, "A community water supply that serves more than 1,000 people shall implement an asset management program…beginning January 1, 2018". In addition, Section 325 of Michigan Public Act 399 states that, "Water supplies with lead service lines, regardless of lead action level values, must replace all lead service lines at an average rate of 5 percent per year (starting in 2021), not to exceed 20 years, or in accordance with an alternate schedule incorporated into an asset management plan and approved by EGLE." In order to fulfill the requirements, set forth in Public Act 399, the City of Pleasant Ridge has requested an asset management plan be prepared by Anderson, Eckstein and Westrick, Inc. (AEW). With growing concerns over an aging system, new LCR rules, economic cataclysms, and deteriorating infrastructure, AEW has analyzed five core questions set forth by the Michigan Department of Environment, Great Lakes and Energy (EGLE):

1. What current, major assets do I possess?
2. What is my required sustained level of service?
3. Which assets are critical to sustained performance?
4. What are my most advantageous O&M and CIP investment strategies?
5. What is the best long-term funding strategy?

Shown in Figure 1 below, is a visual representation of the process in creating the asset management plan.

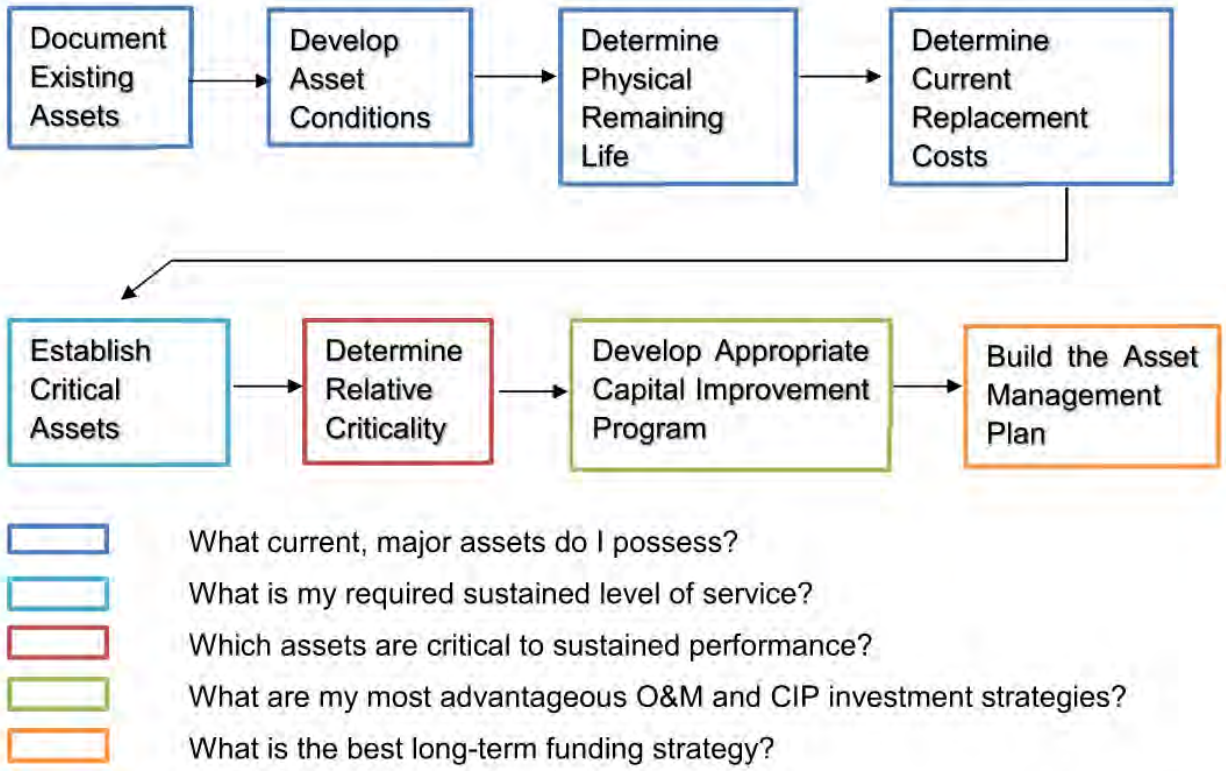


Figure 1. Process for Asset Management Plan Development

3.0 ASSET REGISTRY

The City of Pleasant Ridge encompasses approximately 0.57 square miles in southeastern Oakland County. Development in the City consists primarily of single-family residential areas. Commercial development lies predominately along Woodward Avenue. The City provides drinking water to its residents, approximately 2,500 people or 1,147 customers. The City purchases it's drinking water from the Great Lakes Water Authority (GLWA) via the Southeastern Oakland County Water (SOCWA), and then distributes it within the City via their own water distribution system, which the City of Royal Oak maintains on behalf of Pleasant Ridge. The known major water assets owned by the City that are included in this evaluation are as follows:

1. Water Mains
    a. Approximately 11 miles

2. Water Structures and Valves
    a. 104 valves, including gate wells and d-boxes

3. Fire Hydrants
    a. 97 fire hydrants

4. Water Service Lines
    a. 1,149 Total Service Lines
        i. 522 Lead Service Lines
        ii. 391 Copper Service Lines
        iii. 178 Unknown, Suspected Lead Service Lines
        iv. 58 Unknown, Suspected Copper Service Lines

5. Water System Connections
    a. 1 Metered Connection to SOCWA
    b. 4 Emergency Connections

Asset data was compiled from engineering plans, City of Pleasant Ridge operational plans, and correspondence from City Staff and field inspections. The data was then consolidated into a single workspace. Consolidated groups were divided into subcategories. The following sections summarize those subcategories; existing assets, remaining life, typical rehabilitation and replacement costs, and determination of critical assets.

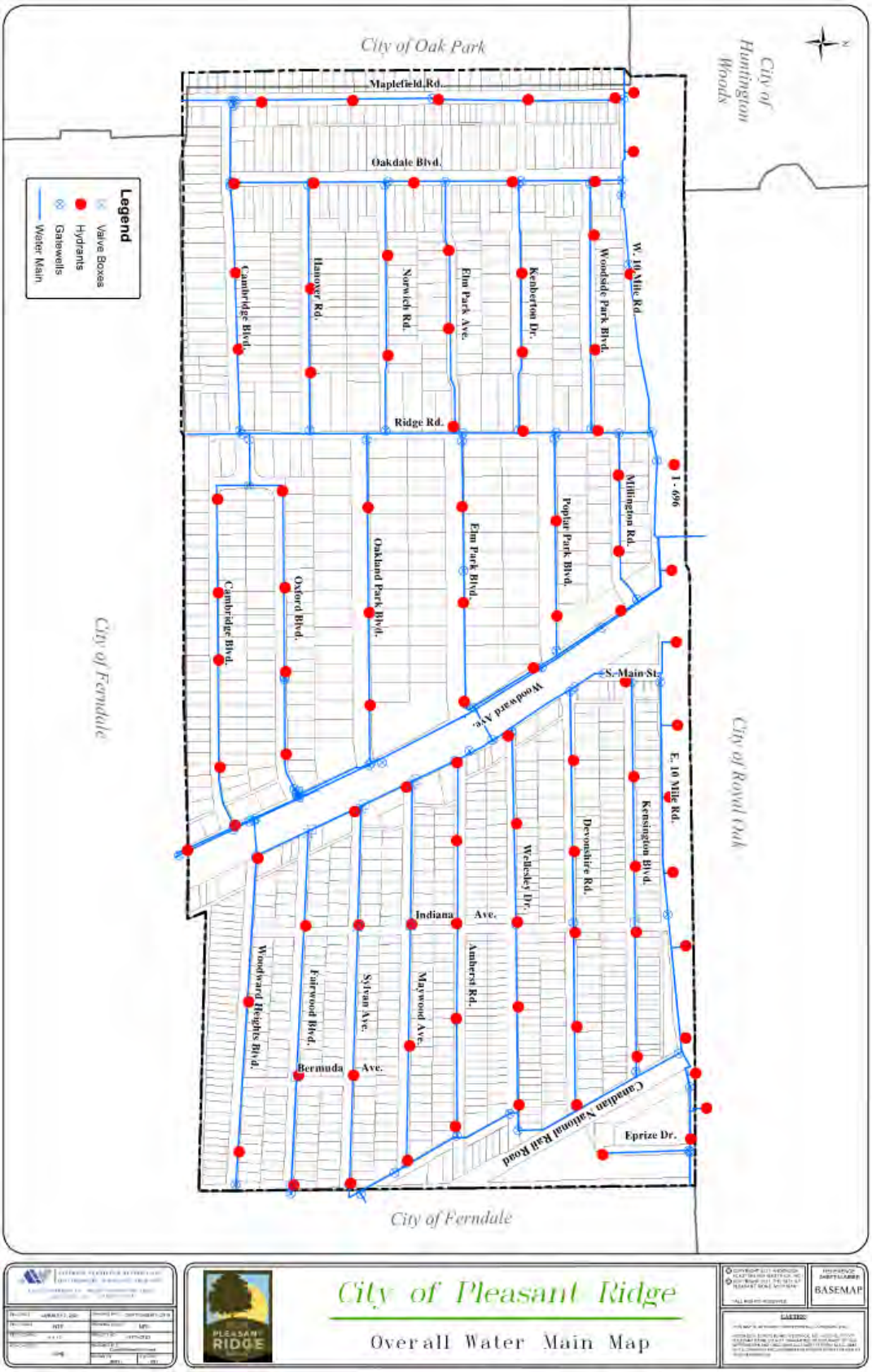


Figure 2. City of Pleasant Ridge Water Distribution Map

3.1 Water Mains

3.1.1 Assets

The City of Pleasant Ridge currently owns just under 11 miles of water mains ranging in size from 6 inches to 12 inches. Table 5 shows the total length of water main for each size of pipe. Water mains comprising the City's water system were constructed between 1920 and 2020, with a weighted average construction year of 1939. Furthermore, City water mains are located underneath a variety of surfaces, the most common being under City Minor Roads (pavement). The completed drinking water main asset inventory can be found in the appendix.

Table 5. Water Main Inventory – Pipe Size and Length

Diameter (inch)	Total Length (feet)	Percentage (%)
6	32,066	57%
8	8,262	15%
10	7,581	13%
12	8,642	15%
Total	56,551	100%

Table 6. Water Main Inventory – Pipe Location and Length

Road Type	Length of Water Main (feet)	Percentage (%)
Local Road	46,817	83%
Major Road	9,734	17%
Total	56,551	100%

Table 7. Water Main Inventory – Pipe Material and Length

Pipe Material	Length of Water Main (feet)	Percentage (%)
Cast Iron	39,582	70%
Ductile Iron	15,492	27%
HDPE	1,477	3%
Total	56,551	100%

Table 8. Watermain Inventory – Pipe Age and Length

Pipe Age (Year)	Length of Water Main (feet)	Percentage (%)
Pre 1950	39,582	70%
1950-1959	0	0%
1960-1969	0	0%
1970-1979	6,354	11%
1980-1989	4,672	8%
1990-1999	2,324	4%
Post 1999	3,619	6%
Total	56,551	100%

3.1.2 Remaining Service Life

The remaining service life of an asset is considered design life less the years in service. The material, quality of construction, usage and environment can all affect the remaining service life of water mains. An industry researcher of water main pipe, Ductile Iron Pipe Research Association, indicates a service life of approximately 90-100 years for ductile iron water main pipe. This same pipe life span was applied to cast iron and HDPE pipe as well. With a weighted average construction year of 1939, and a design service life of 90-100 years, approximately 70% of the city water mains have depleted their remaining service life.

3.1.3 Typical Replacement Costs

Three installation methods were considered for water main replacement which are open cut, pipe bursting and directional drill. Open cut replacement consists of fully excavating the location of the new water main, installing it, and connecting the new water main to the existing water system. Pipe bursting involves pulling a new water main through the existing water main with a breaker head on the pipe that breaks apart the existing pipe, requiring less excavation. Directional drilling also involves less excavation as well. It involves drilling through the existing subgrade in the desired location of the new water main, before pulling the new main through the drilled hole.

After gathering information from previous AEW water main projects Table 9 was created to display the estimated replacement cost per foot of water main by

diameter and replacement method. These prices include design services, construction inspection and construction administration prices as well as gate valve and hydrant costs. Since deciding which replacement method to use is project specific, the below figures are a typical average and do not represent each section of water main. Engineers estimate of costs, broken up by street block, has been prepared as part of this asset management plan. They are attached in the appendix.

Table 9. Water Main Replacement Average Unit Price

Pipe Diameter (inch)	Open Cut (Price/Foot)	Directional Drill (Price/Foot)	Pipe Burst (Price/Foot)
6	$ 500	$ 400	$ 400
8	$ 500	$ 450	$ 450
10	$ 600	$ 550	$ 550
12	$ 800	$ 700	$ 700

3.1.4 Critical Water Mains & Relative System Criticality

Not all assets are equally critical to a utility's operation. Some assets are extremely critical to the system while others are less critical. The criticality of City water mains is often managed informally, based on city personnel's judgement and experience. While this process is both important and functional in final decision making, a slightly more formalized technique was utilized to compare all sections of water main. To determine the criticality of assets, two questions were asked:

1. What is the probability an asset will fail?
2. What is the consequence of failure for the given asset?

To complete this task, EGLE Asset Management Guide was followed by assigning numerical values of 1-5 for both criticality of failure (COF) and probability of failure (POF). According to EGLE, any asset with a combined score of 16 or greater is deemed critical. It is noted that water main sections were analyzed separately of their corresponding valves, hydrants and service lines. While critical assets were identified, these results were combined with managements judgement and experience to develop the capital improvement plan.

Of the many factors that can be used to calculate the probability of failure, the age of the water main ultimately dictated failure. Typically, the history of breaks would play a significant role in determining the POF score of the water main, however, there are zero water main breaks on record at the City.

Table 10. Probability of Failure – Water Mains

Description		Expended Useful Life	Failure Based on Service History
Weighting Factor		50%	50%
Performance Rating	5	Percent of Useful Life: >80% (Pre 1940)	Imminent (>4 Breaks on Record)
	4	Percent of Useful Life: 60%-80% (1940-1960)	Probable (>=1 Break on Record)
	3	Percent of Useful Life: 40%-60% (1960-1980)	Occassional
	2	Percent of Useful Life: 20%-40% (1980-2000)	Remote (No Breaks on Record)
	1	Percent of Useful Life: <20% (Post 2000)	Improbable
Note: There were no found water main breaks in City Records.			

The consequence of failure (COF) was calculated using four driving factors: proximity to a major roadway, pipe size, pipe age, and if the water main diameter is undersized based on the current Industry sizing standards. Their factors were determined as follows:

Table 11. Consequence of Failure – Water Mains

Description		Disruption to Community	Emergency Use Impact	Financial Impact	Process Impact - Age Based
Weighting Factor		25%	25%	25%	25%
Performance Rating	5	Long term impact; area-wide disruption (located on a major road)	Major Impact (Pipe is undersized by 6 inches)	Major Cost (12" Main)	Imminent (Pre 1950)
	4	N/A	Significant Impact (Pipe is undersized by 4 inches)	Significant Cost (10" Main)	Probable (1970s)
	3	Sporadic Disruptions (located on a local road)	N/A	Moderate Cost (8" Main)	Occassional (1980s)
	2	N/A	Probable Impact (Pipe is undersized by 2 inches)	Minor Cost (6" Main)	Remote Chance (1990s)
	1	No Disruption (Located outside of pavement)	No Impact (Pipe is not undersized)	N/A	Improbable (Post 2000)

The system relative criticality score is then determined by multiplying the POF and COF scores. Pleasant Ridge's water mains yielded a minimum relative criticality score of 4.2, a maximum score of 16.1, and an average criticality score of 11.8. Table 12 shows the length of water main in each criticality score grouping. The full criticality analysis can be found in the appendix.

Table 12. Water Main Relative System Criticality

Criticality Score	Length of Water Main (feet)	Percentage (%)
< 5.0	6,878	12%
5.1 – 10.0	11,081	20%
10.1 – 15.9	36,653	65%
≥ 16.0	1,939	3%
Total	56,551	100%

3.2 Water Structures and Valves

3.2.1 Assets

In total, 104 isolation valves were accounted for during the system inventory. This includes 89 Gate Wells and Valves and 15 D-Boxes. Water structures and valves were considered to be constructed with their corresponding water line segments, unless otherwise noted; with an average construction year of 1941. Water valves are located underneath a variety of surfaces, the most common being under City Minor Roads (pavement). The complete drinking water structure and valve asset inventory can be found in the appendix.

Table 13. Water Structures & Valves Inventory – Gate Valve Size and Count

Gate Valve Size (inch)	No. of Gate Valves (each)	Percentage (%)
6	44	49%
8	14	16%
10	15	17%
12	16	18%
Total	89	100%

Table 14. Water Structures & Valves Inventory – Gate Valve Location and Count

Road Type	No. of Gate Valves (each)	Percentage (%)
Local Road	63	71%
Major Road	26	29%
Total	89	100%

Table 15. Water Structures & Valves Inventory – Gate Valve Age and Count

Gate Valve Age (Year)	No. of Gate Valves (each)	Percentage (%)
Pre 1950	61	69%
1950-1959	0	0%
1960-1969	0	0%
1970-1979	8	9%
1980-1989	8	9%
1990-1999	4	4%
Post 1999	8	9%
Total	89	100%

3.2.2 Remaining Service Life

Historical observation indicates that water valves often need replacement or rehabilitation prior to needed improvements of the water mains. Therefore, based on the known service life of water valves and structures within the City, a service life of 70 years has been estimated. With a weighted average construction year of 1941, and a design service life of 70 years, approximately 69% of the city water structures and valves have depleted their remaining service life.

With constant monitoring and an annual valve turning program, the service life of the water valve assets may be prolonged. An industry manufacturer of water valves, Mueller Company, also recommends implementing a stem replacement program for a prolonged service life.

3.2.3 Typical Replacement Costs

The only method analyzed for the rehabilitation or replacement of gate valves was full replacement. The City's practice is to replace gate valves during water

main replacement. After gathering information from previous AEW projects Table 16 was created to display the estimated replacement cost by valve diameter. These prices include design services, construction inspection and construction administration prices.

Table 16. Water Structures & Valves Replacement Average Unit Price

Gate Valve Size (inch)	Gate Valve and Well	Gate Valve and Box
6	$ 7,600	$ 4,100
8	$ 7,900	$ 4,300
10	$ 8,400	$ 5,500
12	$ 8,700	$ 6,000

3.2.4 Critical Water Structures & Relative System Criticality

The EGLE Asset Management Guide was also followed for designating the critical water structures and valves. Overall, 7 structures were deemed critical (16 or greater score) based on EGLE guidelines when the POF and COF were combined. The probability of failure and consequence of failure were determined as follows:

Table 17. Probability of Failure – Water Structures & Valves

Performance Rating	Expended Useful Life
5	Percent of Useful Life: >80% (Pre 1940)
4	Percent of Useful Life: 60%-80% (1940-1960)
3	Percent of Useful Life: 40%-60% (1960-1980)
2	Percent of Useful Life: 20%-40% (1980-2000)
1	Percent of Useful Life: <20% (Post 2000)

The consequence of failure was calculated using three equal driving factors, gate valve age, pipe size and proximity to a major roadway. Their factors were determined as follows:

Table 18. Consequence of Failure – Water Structures & Valves

Description		Disruption to Community	Financial Impact	Process Impact - Age Based
Weighting Factor		33%	33%	33%
Performance Rating	5	Long term impact; area-wide disruption (located on a major road)	Major Cost (12" Valve)	Imminent (Pre 1950)
	4	N/A	Significant Cost (10" Valve)	Probable (1970s)
	3	Sporadic Disruptions (located on a local road)	Moderate Cost (8" Valve)	Occassional (1980s)
	2	N/A	Minor Cost (6" Valve)	Remote Chance (1990s)
	1	No Disruption (Located outside of pavement)	N/A	Improbable (Post 2000)

The system relative criticality score is then determined by multiplying the POF and COF scores. Pleasant Ridge's water structures and valves yielded a minimum relative criticality score of 4.2, a maximum score of 17.5, and an average criticality score of 11.5. Table 19 shows the number of water structures and valves in each criticality score grouping. The full criticality analysis can be found in the appendix.

Table 19. Water Structures & Valves Relative System Criticality

Criticality Score	Number (Ea)	Percentage (%)
≤ 5.0	10	11%
5.1-10	18	20%
10.1-15.9	54	61%
≥ 16.0	7	8%
Total	89	100%

3.3 Fire Hydrants

3.3.1 Assets

The drinking water distribution system contains 97 fire hydrants. Hydrants were considered to be constructed with their corresponding water line segments, unless otherwise noted; with an average construction year of 1947. The complete fire hydrant asset inventory can be found in the appendix.

Table 20. Fire Hydrant Inventory – Location

Road Segment	Approximate Road Length (feet)	No. of Hydrants on Street (each)	Average Distance Between Hydrants (feet)	Percentage (%)
E. 10 Mile	2,500	9	278	9%
W. 10 Mile	2,600	5	520	5%
Amherst	2,000	4	500	4%
Bermuda	600	0	N/A	0%
Cambridge	4,000	7	571	7%
Devonshire	2,100	5	420	5%
Elm Park Ave	1,300	3	433	3%
Elm Park Blvd	1,450	3	483	3%
Eprize (Private)	450	1	450	1%
Fairwood	2,000	3	667	3%
Hanover	1,300	2	650	2%
Indiana	2,150	0	N/A	0%
Kenberton	1,650	2	825	2%
Kensington	2,050	4	513	4%
Main	300	1	300	1%
Maplefield	2,050	5	410	5%
Maywood	2,000	3	667	3%
Millington	900	2	450	2%
Norwich	1,300	2	650	2%
Oakdale	2,050	5	410	5%
Oakland Park	1,700	3	567	3%
Oxford	1,750	4	438	4%
Poplar Park	1,150	2	575	2%
Ridge	2,300	2	1,150	2%
Sylvan	2,050	3	683	3%
Wellesley	2,050	4	513	4%
Woodside Park	1,300	2	650	2%
Woodward - Northbound	2,800	5	560	5%
Woodward - Southbound	2,800	4	700	4%
Woodward Heights	1,800	2	900	2%
Total		97	569	100%

3.3.2 Remaining Service Life

Fire hydrants longevity tends to mirror the condition of the water mains. Therefore, based on the known useful life of fire hydrants and water mains within the City, a service life of 90 years has been estimated. With constant monitoring and an annual winter, draw-down program, the service life of the hydrants may be prolonged.

3.3.3 Typical Replacement Costs

The only method analyzed for the repair of fire hydrants was full replacement. Current weighted average item prices, taken from Michigan Engineers' Resource Library (MERL), was used for typical unit pricing. Removal of existing fire hydrants was valued at $500/each and fire hydrant replacement cost was valued at $5,500/each, summing to a total, typical unit price of $6,000/hydrant. Note, a hydrant replacement program was not considered separately from other capital improvement projects, as shown in the capital improvement plan.

3.3.4 Critical Fire Hydrants & Relative System Criticality

The EGLE Asset Management Guide was also followed for designating the critical fire hydrants. Overall, zero hydrants were deemed critical (16 or greater score) based on EGLE guidelines when the POF and COF were combined. The probability of failure and consequence of failure were determined as follows:

Table 21. Probability of Failure – Fire Hydrants

Performance Rating	Expended Useful Life
5	Percent of Useful Life: >80% (Pre 1940)
4	Percent of Useful Life: 60%-80% (1940-1960)
3	Percent of Useful Life: 40%-60% (1960-1980)
2	Percent of Useful Life: 20%-40% (1980-2000)
1	Percent of Useful Life: <20% (Post 2000)

Table 22. Consequence of Failure – Fire Hydrants

Description		Disruption to Community	Ability to Improvise in Fire Fighting Conditions	Process Impact - Age Based
Weighting Factor		33%	33%	33%
Performance Rating	5	Long term impact; area-wide disruption (located on a major road)	Improbable Chance (12" Incoming Main)	Imminent (Pre 1950)
	4	N/A	Remote Chance (10" Incoming Main)	Probable (1970s)
	3	Sporadic Disruptions (located on a local road)	Moderate Chance (8" Incoming Main)	Occassional (1980s)
	2	N/A	Probable Chance (6" Incoming Main)	Remote Chance (1990s)
	1	No Disruption (Located outside of pavement)	N/A	Improbable (Post 2000)

The system relative criticality score is then determined by multiplying the POF and COF scores. Pleasant Ridge's fire hydrants yielded a minimum relative criticality score of 4.2, a maximum score of 14.0, and an average criticality score of 10.7. Table 23 shows the number of fire hydrants in each criticality score grouping. The full criticality analysis can be found in the appendix.

Table 23. Fire Hydrants Relative System Criticality

Criticality Score	Number (Ea)	Percentage (%)
≤ 5.0	11	10%
5.1-10	30	31%
10.1-15.9	56	58%
≥ 16.0	-	-
Total	97	100%

3.4 Water Service Lines

3.4.1 Assets

In total, 1,149 water service lines were accounted for during the distribution system material inventory. Ages of water service lines were taken from their corresponding water service cards or building permit records. It was found that a citywide average construction year is 1934. Water service line material was also recorded

from the corresponding water service cards or building permit records. It was found that service cards were available for services installed pre-1960, and that building permit records were available for services installed post 1995. The services installed within the 35-year gap still need to be verified for service material.

Table 24. Water Service Line Inventory – Service Age and Count

Water Service Age (Year)	No. of Services (each)	Percentage (%)
Pre 1920	56	5%
1920-1929	614	53%
1930-1939	157	14%
1940-1949	127	11%
1950-1959	145	13%
1960-1969	19	2%
1970-1979	7	1%
1980-1989	4	0%
1990-1999	7	1%
Post 1999	9	1%
Unknown	4	0%
Total	1,149	100%

Table 25. Water Service Line Inventory – Service Material and Count

Water Service Material	No. of Services (each)	Percentage (%)
Lead	522	45%
Copper	391	34%
Unknown, Suspected to be Lead	178	15%
Unknown, Suspected to be Copper	58	5%
Total	1,149	100%

Table 26. Water Service Line Inventory – Service Location, Material and Count

Road Segment	No. of Lead/Suspected Lead Services (each)	No. of Services (each)	Percentage (%)
E. 10 Mile	0	3	0%
W. 10 Mile	N/A	N/A	N/A
Amherst	38	76	50%
Bermuda	N/A	N/A	N/A
Cambridge - (Ridge to Woodward)	24	47	51%
Cambridge - (Maplefield to Ridge)	26	42	62%
Devonshire	45	68	66%
Elm Park Ave	5	26	19%
Elm Park Blvd	13	25	52%
Eprize (Private)	N/A	N/A	N/A
Fairwood	49	65	75%
Hanover	27	35	77%
Indiana	N/A	N/A	N/A
Kenberton	16	23	70%
Kensington	74	86	86%
Main	N/A	N/A	N/A
Maplefield	5	82	6%
Maywood	50	67	75%
Millington	1	19	5%
Norwich	22	28	79%
Oakdale	56	73	77%
Oakland Park	17	30	57%
Oxford	15	44	34%
Poplar Park	17	20	85%
Ridge	18	25	72%
Sylvan	50	64	78%
Wellesley	66	84	79%
Woodside Park	26	32	81%
Woodward	2	19	11%
Woodward Heights	38	66	58%
Total	700	1,149	61%

Figure 3. City of Pleasant Ridge Water Service Material Map

3.4.2 Remaining Service Life

Longevity of water service lines tends to mirror the condition of the water mains. Therefore, based on the known useful life of water mains within the City, a service life of 90 years has been estimated. With an average construction year of 1934, and a design service life of 90 years, approximately 58% of the city water service lines have depleted their remaining service life.

3.4.3 Typical Replacement Costs

The only method analyzed for the rehabilitation or replacement of water service lines was full replacement. Current observed average unit prices of AEW projects are $12,000/service. This is an average cost of long and short leads and includes replacement from the water main to 18" inside of the home. This price also includes pavement replacement and restoration. It is noted that the City only owns to the stop box, however, for planning purposes and in accordance with Michigan Public Act 399, financial planning has taken into consideration the private portion.

3.4.4 Critical Water Services & Relative System Criticality

The EGLE Asset Management Guide was not followed for considering criticality of water service lines. This guide was not followed for two reasons; 1) water services age with the adjacent water mains and are replaced when the water main is replaced, therefore water main criticality would take general precedence and 2) Section 325 of Michigan Public Act 399 states that, "Water supplies with lead service lines, regardless of lead action level values, must replace all lead service lines…in accordance with an alternate schedule incorporated into an asset management plan and approved by EGLE." With the number of known lead or suspected lead service lines as shown in tables 25 and 26, combined with the financial impact of replacing one service line, all lead services lines are viewed as critical for replacement within the City's system. Their schedule for replacement is discussed in the below sections.

4.0 LEVEL OF SERVICE

A baseline inventory of the drinking water assets has been established, and the second question posed by the AMP is considered; "What is my required sustained level of service?". Service levels are a utility's stated commitment to deliver service to a customer at a specific level of quality and reliability, while maintaining satisfactory treatment quality and regulatory compliance. Notice that three parties are mentioned in this level of service definition and that this definition may vary between the community expectations, customer expectation and regulatory requirements. Therefore, thought was given to all three views when determining a goal for desired level of service. Level of Service to the City of Pleasant Ridge is defined by the following key indicators and performance measurements:

Table 27. Level of Service – Performance Indicators

Description		Community Concern - Controlling the Cost	Customer Concern - No Service Interruptions	Regulatory Concern - No Primary or Secondary Violations
Weighting Factor		33%	33%	33%
Performance Rating	1	Water Purchased vs. Water Sold - System Water Loss (>15%)	Annual Water Main Breaks (>4)	No. of Primary of Secondary Violations over the last 3 Years (>2)
	3	Water Purchased vs. Water Sold - System Water Loss (10%-15%)	Annual Water Main Breaks (1-4)	No. of Primary of Secondary Violations over the last 3 Years (1)
	5	Water Purchased vs. Water Sold - System Water Loss (<10%)	Annual Water Main Breaks (0)	No. of Primary of Secondary Violations over the last 3 Years (0)

Table 28. Level of Service – Performance Measurement

Performance Rating	Description	5-Star System
5	Excellent	★★★★★
4	Above Average	★★★★☆
3	Average	★★★☆☆
2	Below Average	★★☆☆☆
1	Poor	★☆☆☆☆

The level of service, Community Concern – Controlling the Cost, ratio of water purchased to water sold, is defined as the volume of metered and billed water usage. The ratio of water purchased to water sold can be used to gauge the overall condition of the

distribution system. In addition, the City still pays for all water purchased from their supplier. On average, the City has experienced an annual water loss of approximately 16% over the past three years.

The level of service, Customer Concern – No Service Interruptions, annual water main breaks, is defined as breaks occurring on the water distribution pipes per year. An excessive number of main breaks in a given year can be an indicator of the overall, declining, integrity of the distribution system. In addition, a wider area must be isolated in order to fix the break, causing service interruptions to the customer. The City's tenure for water main breaks has been excellent, as no breaks are recorded on file.

The last level of service, Regulatory Concern – No primary or secondary violations are defined as violations per maximum contaminant limits or customer complaint. Primary drinking water regulations are limits set for substances that pose a threat to health when present in drinking water at certain levels. Secondary drinking water regulations are non-enforceable federal guidelines regarding taste, odor, color and certain other non-aesthetic effects of drinking water. Since the City purchases its water, most of these limits are controlled and monitored by parties outside their control. However, lead action levels (primary violation) is something that the City tests, monitors and reports. There has been zero noted primary or secondary drinking water violations over the past three years.

Based on the City's level of service performance indicators, a look back at the three-year average would indicate that the City is providing an average to above average level of service and a 3.6/5 stars on the 5-Star System Scale. This includes average annual water loss greater than 15%, no water main breaks, and no drinking water violations.

5.0 ASSETS CRITICAL TO SUSTAIN PERFORMANCE

The third question considered by the AMP is, "Which assets are critical to sustained performance?". An understanding of how assets fail, the likelihood of failure and the consequence of failure must be documented. Documentation for evaluating these failures has been previously noted, and also monitored during the water reliability studies. The Business Risk Exposure or criticality ultimately being evaluated centers on the failure

of an asset and the impact to the entire system. Failure is defined as the inability of any asset to perform at its expected level of service.

When analyzing the assets owned by the City, it was determined that all assets related to the water distribution infrastructure are equally critical in providing the desired level or service. Assets that have been identified below as needing capital improvement were selected, in-part, from the formal Criticality framework, as identified within this report, as well as an informal approach based on city personnel's judgement and experience. It is believed that a formal and informal critical selection process is needed for budgeting cost effective solutions that ensure long-term funding strategies while meeting the defined level of service. These solutions are presented in the next section, 6.0 Capital Improvement Plan.

6.0 CAPITAL IMPROVEMENT PLAN

In the City of Pleasant Ridge, in order for a project to qualify as a capital project, the project must cost more than $10,000 and the asset must have a useful life of at least three years. All assets discussed in this report qualify under this definition. A sufficient capital improvement plan forecasts all system needs within the range of the plan. However, a plan that does not consider customer cost relative to adjacent distribution providers will not be approved by commission. Therefore, several iterations of the following plan were developed always keeping in perspective anticipated system needs and subsequent user cost. Put forth, is an EGLE alternate 30-year capital improvement plan that has been created to identify capital projects, provide a schedule and financing options, matches road deterioration schedule, and arranges capital needs to match the anticipated budget of the Utility Fund. This plan is displayed below as Table 1, in addition, the corresponding Section 325 average lead service line replacement schedule is provided as Table 2.

Table 1. Capital Improvement Plan

Fiscal Year	Capital Project(s)	No. of LSLs to be replaced with Capital Project(s)	Planned Capital Project Costs	Anticipated Capital Budget (Depreciation + Normal Capital + LSL)	Balance - Utility Fund
2021-22	Elm Park Blvd & Maplefied & Millington & NB Woodward - LSL Replacement Only[3]	21	$ 73,500.00	$ 800,000.00	$ 726,500.00
2022-23	Operating Transfer In - Capital		$ -	$ 300,000.00	$ 1,026,500.00
2022-23	Kensington - Full WM Reconstruct	74	$ 1,581,200.00	$ 800,000.00	$ 245,300.00
2023-24	Nothing	0	$ -	$ 800,000.00	$ 1,045,300.00
2024-25	Oakdale - Full WM Reconstruct	56	$ 1,572,200.00	$ 800,000.00	$ 273,100.00
2025-26	Nothing	0	$ -	$ 800,000.00	$ 1,073,100.00
2026-27	Wellesley - Full WM Reconstruct	66	$ 1,602,400.00	$ 800,000.00	$ 270,700.00
2027-28	Nothing	0	$ -	$ 800,000.00	$ 1,070,700.00
2028-29	Indiana - New WM Reconstruct & SB Woodward, Elm Park to Oakland Park	N/A	$ 1,368,280.00	$ 800,000.00	$ 502,420.00
2029-30	Woodward Heights Blvd - Full WM Reconstruct	38	$ 1,280,000.00	$ 800,000.00	$ 22,420.00
2030-31	Nothing	0	$ -	$ 800,000.00	$ 822,420.00
2031-32	Amherst - Full WM Reconstruct	38	$ 1,413,700.00	$ 800,000.00	$ 208,720.00
2032-33	Nothing	0	$ -	$ 800,000.00	$ 1,008,720.00
2033-34	Fairwood Blvd - Full WM Reconstruct	49	$ 1,321,700.00	$ 800,000.00	$ 487,020.00
2034-35	Nothing	0	$ -	$ 800,000.00	$ 1,287,020.00
2035-36	Sylvan Ave - Full WM Reconstruct	50	$ 1,376,300.00	$ 800,000.00	$ 710,720.00
2036-37	Poplar Park - Full WM Reconstruct	17	$ 676,500.00	$ 800,000.00	$ 834,220.00
2037-38	Woodside Park - Full WM Reconstruct	26	$ 786,900.00	$ 800,000.00	$ 847,320.00
2038-39	Devonshire - Full WM Reconstruct	45	$ 1,505,400.00	$ 800,000.00	$ 141,920.00
2039-40	Nothing	0	$ -	$ 800,000.00	$ 941,920.00
2040-41	Maywood Ave - Full WM Reconstruct	50	$ 1,412,000.00	$ 800,000.00	$ 329,920.00
2041-42	Nothing	0	$ -	$ 800,000.00	$ 1,129,920.00
2042-43	Kenberton & Elm Park Ave - Full WM Reconstruct	21	$ 1,387,500.00	$ 800,000.00	$ 542,420.00
2043-44	Hanover - Full WM Reconstruct	27	$ 808,200.00	$ 800,000.00	$ 534,220.00
2044-45	Norwich - Full WM Reconstruct	22	$ 772,100.00	$ 800,000.00	$ 562,120.00
2045-46	Cambridge Blvd (Maplefied to Ridge) - Full WM Reconstruct	26	$ 990,100.00	$ 800,000.00	$ 372,020.00
2046-47	Nothing	0	$ -	$ 800,000.00	$ 1,172,020.00
2047-48	Cambridge Blvd (Ridge to Woodward) - Full WM Reconstruct	24	$ 1,272,600.00	$ 800,000.00	$ 699,420.00
2048-49	Oakland Park - Full WM Reconstruct	17	$ 916,000.00	$ 800,000.00	$ 583,420.00
2049-50	Ridge - Full WM Reconstruct	18	$ 1,202,700.00	$ 800,000.00	$ 180,720.00
2050-51	Nothing	0	$ -	$ 800,000.00	$ 980,720.00
2051-52	Oxford - Full WM Reconstruct	15	$ 1,189,100.00	$ 800,000.00	$ 591,620.00
Total		**700**	**$24,508,380.00**	**$ 25,100,000.00**	**$ 591,620.00**

Note(s): 1) Project Costs and Anticipated Capital Budget are in today's dollars. It is assumed that inflation of project costs will be offset by rate increases. **2)** A Capital Project is defined as a project with a cost of more than $10,000 and having a useful life of at least 3 years. 3)Only private side of service needs to be replaced. Estimated cost is $3,500/private service line.

Table 2. Lead Service Line Replacement Schedule

Year	Required No. of LSL's to be replaced	Required cumulative No. of LSL's to be replaced	No. of LSLs to be replaced per CIP	Cumulative No. of LSL's to be replaced per CIP	Difference
1	22	22	21	21	-1
2	23	45	74	95	50
3	22	67	0	95	28
4	23	90	56	151	61
5	22	112	0	151	39
6	23	135	66	217	82
7	22	157	0	217	60
8	23	180	0	217	37
9	22	202	38	255	53
10	24	226	0	255	29
11	22	248	38	293	45
12	23	271	0	293	22
13	22	293	49	342	49
14	23	316	0	342	26
15	22	338	50	392	54
16	23	361	17	409	48
17	22	383	26	435	52
18	23	406	45	480	74
19	22	428	0	480	52
20	24	452	50	530	78
21	22	474	0	530	56
22	23	497	21	551	54
23	22	519	27	578	59
24	23	542	22	600	58
25	22	564	26	626	62
26	23	587	0	626	39
27	22	609	24	650	41
28	23	632	17	667	35
29	22	654	18	685	31
30	24	678	0	685	7
31	22	700	15	700	0

7.0 FUNDING STRUCTURE AND RATE METHODOLOGY

After analyzing the first four core questions set forth by the Michigan Department of Environment, Great Lakes and Energy for developing an AMP, the fifth core question, "What is the best long-term funding strategy?" is considered:

The City's fiscal year begins on July 1 and concludes on June 30 each year. As part of the budget process, City staff analyze anticipated costs to receive water, prepare an Operating and Maintenance Budget as well as a Capital Improvements Budget for the City Commission's consideration. The budgets are prepared to support the City's Level of Service Goals.

The City receives its water from the Southeastern Oakland County Water Authority (SOCWA) via the Great Lakes Water Authority (GLWA). The City must annually budget for the fixed and variable costs in order to receive water. These expenses are incurred by the City and are incidental to the City's assets, however historically comprise forty percent of the overall expense budget.

The City's O&M Budget is a financial plan that outlines the proposed expenditures for the coming fiscal year and estimates the revenues that will be needed to finance them. Upon approval by City Commission, the budget appropriation becomes the legal basis for expenditures in the budget year. These expenditures generally include wages, fringe benefits, maintenance, equipment, and fixed pass thru costs.

The City has prepared a Capital Improvement Plan which identify short-range and long-range projects. These projects are updated on a continuous basis, and concurrent with the O&M Budget, a Capital Improvement Budget is prepared annually within the department. Capital Improvement Projects are defined as new construction, addition or extension costing more than $10,000 and having a useful life of at least three years. The City Manager and departmental staff then work collaboratively to match funding needs and priorities with projected revenues to produce the final budget for Commission Consideration.

Funding for water infrastructure is drawn from one source – the Utility Fund. Within the Utility Fund, there are two sources of revenue for the water system; 1) Water Ready-to-Serve Charge and 2) Water Consumption Charges. These charges are supported by the City Ordinance, Section 74-255, whereas City Commission shall by resolution establish a Consumption Rate and a Ready-to-Serve Charge for water services. As of FYE 2020, the City has approximately 1,150 water customers or approximately 1,400 residential equivalent units in which these charges are allocated.

The City's water ready-to-serve charge is a fixed cost to the user regardless of how much water is consumed. These charges are intended to cover a portion of the O&M and CIP expenses. These charges vary based upon the customer type, residential or non-residential, and are billed bi-monthly per meter.

The City's consumption charge is simply defined as the price the customer pays per volume of water used, which reflect all other costs not accounted for in the Readiness-to-Serve charge. These volumes are calculated by comparing the difference in water meter readings during the billing periods, every two months. In the City of Pleasant Ridge, a consumption charge is defined as cost per 1,000 cubic feet of water. The current funding structure and rate methodology is as follows.

Table 29. Approved FYE 2021 Water Methodology

	Historical		Estimate
	FY 2018-19	FY 2019-20	FY 2020-21
EXPENDITURES			
Water Purchase Needs (GLWA/SOCWA)			
Variable Cost	$ 185,438.08	$ 169,549.40	$ 174,454.11
Fixed Cost	$ 19,536.00	$ 20,892.00	$ 20,376.00
Total Water Purchase Needs	$ 204,974.08	$ 190,441.40	$ 194,830.11
Operations and Maintenance			
Internal labor	$ 78,107.00	$ 58,831.00	$ 59,000.00
Supplies & services	$ 89,069.00	$ 86,018.00	$ 90,000.00
Total Operations and Maintenance Needs	$ 167,176.00	$ 144,849.00	$ 149,000.00
Total Water Purchase and Operating Needs	$ 372,150.08	$ 335,290.40	$ 343,830.11
Capital and Other Needs			
Depreciation	$ 141,387.00	$ 142,500.00	$ 143,000.00
Capital Projects	$ 60,000.00	$ 25,000.00	$ 25,000.00
SDWA Act 399 (LSL) - Capital Projects			
Total Capital and Other Needs	$ 201,387.00	$ 167,500.00	$ 168,000.00
Total Water Expenses	$ 573,537.08	$ 502,790.40	$ 511,830.11
REVENUES			
Volumes (mcf)			
Water Purchased from GLWA/SOCWA Volume	12,136.00	10,820.00	11,133.00
Water Sale Volume to Pleasant Ridge Users	10,092.45	9,301.98	9,387.40
System Water Loss	17%	14%	16%
Consumption Charge Rate	$ 41.25	$ 41.25	$ 44.00
Consumption Charge Revenue (Water Sold x Rate)	$ 416,313.56	$ 383,706.68	$ 413,045.60
Ready-to-Serve Charge Revenue*	$ 216,119.32	$ 228,282.17	$ 296,133.42
Penalties & Interest	$ 18,674.00	$ 19,645.00	$ 19,500.00
Total Water Revenues	$ 651,106.88	$ 631,633.85	$ 728,679.02
Over/(under) Revenue Requirements	$ 77,569.80	$ 128,843.45	$ 216,848.91

Table 30. Approved FYE 2021 Readiness-to-Serve Charge Revenues

Meter Sizes	Residential Customers	Ready-to-Serve Charge	Non - Residential Customers	Ready-to-Serve Charge	Revenue
5/8"	926	$ 42.50	6	$ 42.50	$ 39,610.00
3/4"	104	$ 42.50	9	$ 58.96	$ 4,950.64
1"	82	$ 42.50	2	$ 86.18	$ 3,657.36
1 1/2"	11	$ 42.50	2	$ 108.86	$ 685.22
2"	2	$ 42.50	3	$ 122.45	$ 452.35
				Bi-Monthly Revenue	$ 49,355.57
				Est. FYE 2020 Ready-to-Serve Revenue	**$ 296,133.42**

Committed to obliging the 2018 Lead and Copper Rule under Michigan SDWA Act 399, the City has anticipated future costs to the systems users by inserting anticipated costs associated with the new lead and copper mandate. The City has completed a preliminary distribution system material inventory, and is confident that the City has 700 services containing lead. Utilizing today's dollars of $12,000/service line replacement, the following rate options have been analyzed for fiscal year 2021-22. With the approval of this water asset management plan, it is City Commission's responsibility to adopt resolution for the funding of a 30-year plan which would include the referenced capital improvement plan with a 30-year plan to replace all Lead Service Lines. The following rate analysis displays the revenue deficit that would need to be collected, Table 3, and the anticipated subsequent water rate increases, Table 4.

Table 3. Proposed FYE 2022 Water Rate Methodology

	Historical		Current	FY 2021-22
	FY 2018-19	FY 2019-20	FY 2020-21	30 Year LSL Plan
EXPENDITURES				
Water Purchase Needs (GLWA/SOCWA)				
Variable Cost	$ 185,438.08	$ 169,549.40	$ 174,454.11	$ 178,752.00
Fixed Cost	$ 19,536.00	$ 20,892.00	$ 20,376.00	$ 19,680.00
Total Water Purchase Needs	$ 204,974.08	$ 190,441.40	$ 194,830.11	$ 198,432.00
Operations and Maintenance				
Internal labor	$ 78,107.00	$ 58,831.00	$ 59,000.00	$ 70,000.00
Supplies & services	$ 89,069.00	$ 86,018.00	$ 90,000.00	$ 100,500.00
Total Operations and Maintenance Needs	$ 167,176.00	$ 144,849.00	$ 149,000.00	$ 170,500.00
Total Water Purchase and Operating Needs	$ 372,150.08	$ 335,290.40	$ 343,830.11	$ 368,932.00
Capital and Other Needs				
Depreciation	$ 141,387.00	$ 142,500.00	$ 143,000.00	$ 145,000.00
Capital Projects - see CIP Table	$ 60,000.00	$ 25,000.00	$ 25,000.00	$ 421,666.67
SDWA Act 399 (LSL) - Capital Projects				$ 233,333.33
Total Capital and Other Needs	$ 201,387.00	$ 167,500.00	$ 168,000.00	$ 800,000.00
Total Water Expenses	$ 573,537.08	$ 502,790.40	$ 511,830.11	$ 1,168,932.00
REVENUES				
Volumes (mcf)				
Water Purchased from GLWA/SOCWA Volume	12,136.00	10,820.00	11,133.00	11,200.00
Water Sale Volume to Pleasant Ridge Users	10,092.45	9,301.98	9,387.40	9,400.00
System Water Loss	17%	14%	16%	16%
Consumption Charge Rate	$ 41.25	$ 41.25	$ 44.00	$ 44.00
Consumption Charge Revenue (Water Sold x Rate)	$ 416,313.56	$ 383,706.68	$ 413,045.60	$ 413,600.00
Ready-to-Serve Charge Revenue*	$ 216,119.32	$ 228,282.17	$ 296,133.42	$ 296,133.42
Penalties & Interest	$ 18,674.00	$ 19,645.00	$ 19,500.00	$ 19,500.00
Total Water Revenues	$ 651,106.88	$ 631,633.85	$ 728,679.02	$ 729,233.42
Over/(under) Revenue Requirements	$ 77,569.80	$ 128,843.45	$ 216,848.91	$ (439,698.58)
Required Revenue Increase Percentage - From FYE 21				60%

Table 4. Water Rate Comparison. Pleasant Ridge vs. SOCWA Community.

Community	2019 Water Rate/REU
FYE 22 Pleasant Ridge - 30 Yr LSL Plan	$171 - $179
Huntington Woods	$ 135.75
Southfield	$ 124.59
Lathrup Village	$ 124.30
Royal Oak	$ 120.10
Clawson	$ 113.96
SOCWA Average	$ 109.70
Birmingham	$ 108.73
2019 Pleasant Ridge	$ 106.77
Beverly Hills	$ 105.96
Berkley	$ 105.76

Table 31. 30-Year CIP – Proposed Water Rate Options

Proposed Water Rate Options	Ready-to-Serve Charge per Bi-Month Bill	Consumption Charge per MCF	REU Regular Bill	Rate Increase	Fixed %	GLWA Fixed %
FYE 2020-2021 Current Rates	$ 42.50	$ 44.00	$ 108.50	N/A	41%	60%
Option 1. 30-Year, 800k Capital Plan	$ 42.50	$ 90.78	$ 178.67	65%	25%	60%
Option 2. 30-Year, 800k Capital Plan	$ 105.61	$ 44.00	$ 171.61	58%	63%	60%
Option 3. 30-Year, 800k Capital Plan	$ 100.00	$ 48.17	$ 172.26	59%	60%	60%
Option 4. 30-Year, 800k Capital Plan	$ 68.00	$ 71.88	$ 175.82	62%	41%	60%

8.0 CONCLUSION

In order to sustainably manage the drinking water infrastructure, the City must have the financial resources and capacity to operate, maintain, repair and replace assets as needed. The contents of this report and the user charge rate study shall be analyzed on an annual basis to ensure the needs of the system are being met as well as the desired level of service is being provided. The City of Pleasant Ridge has an aging set of assets that provide essential water services to approximately 2,500 customers in southeastern Oakland County. With constant analyzing and updating of this asset management plan the City will ensure the sustainable long-term operation, maintenance, replacement and expansion of its assets.

APPENDIX

APPENDIX A: OVERALL WATER SYSTEM

N

City of Huntington Woods

City of Royal Oak

City of Oak Park

City of Ferndale

City of Ferndale

I - 696

E. 10 Mile Rd.

W. 10 Mile Rd.

Millington Rd.

Woodside Park Blvd.

Poplar Park Blvd.

Kenberton Dr.

Elm Park Ave.

Elm Park Blvd.

Norwich Rd.

Oakland Park Blvd.

Hanover Rd.

Oxford Blvd.

Cambridge Blvd.

Cambridge Blvd.

S. Main St.

Woodward Ave.

Kensington Blvd.

Devonshire Rd.

Wellesley Dr.

Amherst Rd.

Maywood Ave.

Sylvan Ave.

Fairwood Blvd.

Woodward Heights Blvd.

Canadian National Rail Road

Eprize Dr.

Indiana Ave.

Bermuda Ave.

Maplefield Rd.

Oakdale Blvd.

Ridge Rd.

Legend

- Valve Boxes
- Hydrants
- Gatewells
- Water Main

REFERENCE SHEET NUMBER
BASEMAP

CAUTION

THIS MAP IS INTENDED FOR REFERENCE PURPOSES ONLY

ANDERSON, ECKSTEIN AND WESTRICK, INC. AND THE CITY OF PLEASANT RIDGE DO NOT GUARANTEE THE ACCURACY OF THIS PRODUCT AND ASSUME NO LIABILITY FOR ANY CLAIMS, LOSSES, SUITS, DEMANDS AND JUDGEMENTS ARISING FROM THE USE OF THIS INFORMATION

City of Pleasant Ridge

Overall Water Main Map

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS
51301 SCHOENHERR RD SHELBY TOWNSHIP, MI 48315
www.aewinc.com p:(586)726-1234

PLOT DATE:	JANUARY 7, 2021	DRAWING DATE:	SEPTEMBER 9, 2019
PLOT SCALE:	NTS	DRAWING SCALE:	NTS
PLOT CONFIG	11 x 17	PROJECT NO:	0175-0120
ATTACH XREF	NONE	DRAWING FILE:	Overall WaterMain.mxd
		DRAWN BY:	CHK'D BY: JMM

APPENDIX B: WATER MAIN DIAMETER SUMMARY

N

I - 696

W. 10 Mile Rd.

E. 10 Mile Rd.

Millington Rd.

Woodside Park Blvd.

Poplar Park Blvd.

Kenberton Dr.

Elm Park Ave.

Elm Park Blvd.

Norwich Rd.

Hanover Rd.

Cambridge Blvd.

Oakland Park Blvd.

Oxford Blvd.

Cambridge Blvd.

Maplefield Rd.

Oakdale Blvd.

Ridge Rd.

S. Main St.

Woodward Ave.

Kensington Blvd.

Devonshire Rd.

Wellesley Dr.

Amherst Rd.

Maywood Ave.

Sylvan Ave.

Fairwood Blvd.

Woodward Heights Blvd.

Indiana Ave.

Bermuda Ave.

Eprize Dr.

CANADIAN NATIONAL RAILROAD

Legend

- 6" Main
- 8" Main
- 10" Main
- 12" Main

REFERENCE SHEET NUMBER
BASEMAP

CAUTION

THIS MAP IS INTENDED FOR REFERENCE PURPOSES ONLY
ANDERSON, ECKSTEIN AND WESTRICK, INC. AND THE CITY OF PLEASANT RIDGE DO NOT GUARANTEE THE CORRECTNESS OF THE INFORMATION AND DISCLAIMS ALL LIABILITY FROM ALL CLAIMS, SUITS, DEMANDS AND JUDGEMENTS ARISING FROM THE USE OF THIS INFORMATION

City of Pleasant Ridge

Water Main Diameter Summary

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
Phone 586-726-1234 Fax 586-726-1560

PLOT DATE:	APRIL 4, 2018	DRAWING DATE:	APRIL 4, 2018
PLOT SCALE:	1" = 400'	DRAWING SCALE:	1 = 400
PLOT CONFIG:	11 x 17	PROJECT NO:	0175-0199
ATTACH XREF:	NONE	DRAWING FILE:	MainSize.mxd
		DRAWN BY:	JMM
		CHK'D BY:	MDS

APPENDIX C: CRITICALITY ANALYSIS – WATER MAINS

Run ID	Street	From	To	Material	Road Type	Year Installed	Diameter (in.)	Length (ft.)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF)	Criticality Score (BRE)	Replacement Cost
									Pipe Age	Pipe Size	Undersize Pipe	Road Type				
R018	10 Mile Rd	Woodward	E.C.L.	DI	Major	1977	6	3452.9	0.7	0.5	1.5	1.5	4.2	2.0	8.4	$ 1,139,443
R009	10 Mile Rd	W.C.L.	Woodward	DI	Major	1977	12	2956.5	0.7	1.1	0.5	1.5	3.8	2.0	7.6	$ 1,123,473
R028	Amherst Rd	Woodward	Gainsborough	CI	Local	1920	6	2024.1	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 667,943
R003	Cambridge Blvd	Maplefiled	Ridge	CI	Local	1920	6	1788.6	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 590,238
R016	Cambridge Blvd	Ridge	Woodward	CI	Local	1920	6	2021.6	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 667,120
R026	Devonshire Rd	Woodward	Railroad ROW	DI	Local	1985	6	2251.9	0.6	0.5	1.0	1.0	3.1	2.0	6.2	$ 743,118
R006	Elm Park	Oakdale	Ridge	CI	Local	1920	6	1352.1	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 446,193
R013	Elm Park Blvd	Ridge	Woodward	HDPE	Local	2004	8	1475.7	0.5	0.8	0.5	1.0	2.8	1.5	4.2	$ 486,991
R035	Eprize Dr	10 Mile	South End	CI	Local	1920	6	444.21	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 146,590
R032	Fairwood Blvd	Woodward	E.C.L.	CI	Local	1920	6	1945	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 641,850
R024	Gainsborough Ave	Wellesley	Sylvan	CI	Local	1920	6	1082.8	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 357,339
R004	Hanover Rd	Oakdale	Ridge	CI	Local	1920	6	1344.1	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 443,555
R007	Kenberton Dr	Oakdale	Ridge	CI	Local	1920	6	1352.6	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 446,367
R025	Kensington Blvd	Main St	Railroad ROW	CI	Local	1920	6	2153.8	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 710,748
R001	Maplefield Rd	10 Mile	S. City Limits	DI	Local	1998	8	2325	0.5	0.8	0.5	1.0	2.8	1.5	4.2	$ 767,247
R034	Maywood Ave	Woodward	Gainsborough	CI	Local	1920	6	2058.4	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 679,260
R011	Millington Rd	Ridge	Woodward	DI	Local	2000	8	928.79	0.5	0.8	0.5	1.0	2.8	1.5	4.2	$ 306,502
R005	Norwich Rd	Oakdale	Ridge	CI	Local	1920	6	1348.1	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 444,860
R002	Oakdale Blvd	10 Mile	Cambridge	CI	Local	1920	6	2087.5	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 688,872
R014	Oakland Park Blvd	Ridge	Woodward	CI	Local	1920	8	1732.3	1.5	0.8	0.5	1.0	3.8	3.5	13.3	$ 571,662
R015	Oxford Blvd	Ridge	Woodward	CI	Local	1920	10	2127.3	1.5	0.0	0.5	1.0	3.0	3.5	10.5	$ 755,195
R012	Poplar Park Blvd	Ridge	Woodward	DI	Local	1985	6	1184.6	0.6	0.5	1.0	1.0	3.1	2.0	6.2	$ 390,927
R023	Railroad ROW	10 Mile	Wellesley	CI	Local	1920	6	978.66	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 322,957
R010	Ridge Road	10 Mile	S.C.L.	CI	Local	1920	6	2420.7	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 798,823
R033	Sylvan Ave	Woodward	Gainsborough	CI	Local	1920	6	2099.9	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 692,968
R027	Wellesley Dr	Woodward	Gainsborough	DI	Local	2000	6	2148.5	0.5	0.5	1.0	1.0	3.0	1.5	4.5	$ 709,018
R008	Woodside Park Blvd	Oakdale	Ridge	CI	Local	1920	8	1346.6	1.5	0.8	0.5	1.0	3.8	3.5	13.3	$ 444,387
R020	Woodward (East Side)	Woodward Heights	Amherst	CI	Major	1920	10	1186.4	1.5	0.0	1.0	1.5	4.0	3.5	14.0	$ 421,156
R022	Woodward (East Side)	Wellesley	N.C.L.	CI	Major	1920	10	973.69	1.5	0.0	1.0	1.5	4.0	3.5	14.0	$ 345,660
R021	Woodward (East Side)	Amherst	N.C.L.	DI	Major	1985	12	1235.6	0.6	1.1	0.5	1.5	3.7	2.0	7.4	$ 469,523
R017	Woodward (West Side)	10 Mile	Elm Park	CI	Major	1920	12	1451.3	1.5	1.1	0.5	1.5	4.6	3.5	16.1	$ 551,476
R029	Woodward (West Side)	Oakland Park	Oxford	CI	Major	1920	12	488.22	1.5	1.1	0.5	1.5	4.6	3.5	16.1	$ 185,524
R030	Woodward (West Side)	Oxford	S.C.L.	CI	Major	1920	10	1044.4	1.5	0.0	1.0	1.5	4.0	3.5	14.0	$ 370,746
R031	Woodward Heights	Woodward	E.C.L.	CI	Local	1920	6	1757.1	1.5	0.5	1.0	1.0	4.0	3.5	14.0	$ 579,828

APPENDIX D: CRITICALITY ANALYSIS – GATE VALVES

Street	Valve ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
10 Mile Rd	V022	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	V023	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	V025	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	V027	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	V044	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	V045	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	V058	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	V080	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
Amherst Rd	V007	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Amherst Rd	V008	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Amherst Rd	V009	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Amherst Rd	V010	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	V069	R003	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	V070	R003	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	V071	R003	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	V073	R016	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	V075	R003	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Devonshire Rd	V017	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Devonshire Rd	V018	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Devonshire Rd	V088	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2

Street	Valve ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
Elm Park	V056	R006	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Elm Park	V057	R006	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Elm Park Blvd	V038	R013	Local	2004	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Elm Park Blvd	V051	R013	Local	2004	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Elm Park Blvd	V052	R013	Local	2004	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Eprize Dr	V024	R035	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Fairwood Blvd	V089	R032	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Gainsborough Ave	V003	R024	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Gainsborough Ave	V004	R024	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Gainsborough Ave	V011	R024	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Hanover Rd	V064	R004	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Hanover Rd	V066	R004	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kenberton Dr	V054	R007	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kenberton Dr	V055	R007	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kensington Blvd	V020	R025	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kensington Blvd	V021	R025	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Maplefield Rd	V076	R001	Local	1998	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Maplefield Rd	V077	R001	Local	1998	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Maplefield Rd	V078	R001	Local	1998	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Maplefield Rd	V079	R001	Local	1998	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2

Street	Valve ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
Maywood Ave	V005	R034	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Millington Rd	V043	R011	Local	2000	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Millington Rd	V046	R011	Local	2000	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Norwich Rd	V063	R005	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Norwich Rd	V065	R005	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakdale Blvd	V059	R002	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakdale Blvd	V060	R002	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakdale Blvd	V061	R002	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakdale Blvd	V062	R002	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakdale Blvd	V067	R002	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakdale Blvd	V068	R002	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakland Park Blvd	V081	R014	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Oxford Blvd	V031	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Oxford Blvd	V034	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Oxford Blvd	V035	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Oxford Blvd	V036	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Oxford Blvd	V074	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Poplar Park Blvd	V041	R012	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Poplar Park Blvd	V050	R012	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Railroad ROW	V026	R023	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0

Street	Valve ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
Ridge Road	V049	R010	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Ridge Road	V053	R010	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Ridge Road	V072	R010	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Sylvan Ave	V002	R033	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Wellesley Dr	V012	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Wellesley Dr	V015	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Wellesley Dr	V087	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Woodside Park Blvd	V047	R008	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Woodside Park Blvd	V048	R008	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Woodward (East Side)	V006	R020	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0
Woodward (East Side)	V014	R021	Major	1985	12	0.6	1.2	0.5	1.5	3.8	2.0	7.6
Woodward (East Side)	V016	R021	Major	1985	12	0.6	1.2	0.5	1.5	3.8	2.0	7.6
Woodward (East Side)	V019	R022	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0
Woodward (East Side)	V083	R021	Major	1985	12	0.6	1.2	0.5	1.5	3.8	2.0	7.6
Woodward (East Side)	V086	R020	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0
Woodward (West Side)	V001	R030	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0
Woodward (West Side)	V013	R017	Major	1920	12	1.5	1.2	0.5	1.5	4.7	3.5	16.5
Woodward (West Side)	V028	R030	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0
Woodward (West Side)	V029	R030	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0
Woodward (West Side)	V030	R030	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0

Street	Valve ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
Woodward (West Side)	V032	R029	Major	1920	12	1.5	1.2	0.5	1.5	4.7	3.5	16.5
Woodward (West Side)	V033	R029	Major	1920	12	1.5	1.2	0.5	1.5	4.7	3.5	16.5
Woodward (West Side)	V037	R029	Major	1920	12	1.5	1.2	0.5	1.5	4.7	3.5	16.5
Woodward (West Side)	V039	R017	Major	1920	12	1.5	1.2	0.5	1.5	4.7	3.5	16.5
Woodward (West Side)	V040	R017	Major	1920	6	1.5	0.5	1.5	1.5	5.0	3.5	17.5
Woodward (West Side)	V042	R017	Major	1920	12	1.5	1.2	0.5	1.5	4.7	3.5	16.5
Woodward (West Side)	V082	R030	Major	1920	10	1.5	0.0	1.0	1.5	4.0	3.5	14.0
Woodward Heights	V084	R031	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Woodward Heights	V085	R031	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0

APPENDIX E: CRITICALITY ANALYSIS – FIRE HYDRANTS

Street	Hydrant ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
10 Mile Rd	H032	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H033	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H034	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H035	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H036	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H037	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H039	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H040	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	H048	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	H059	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	H060	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	H069	R009	Major	1977	12	0.7	1.2	0.5	1.5	3.9	2.0	7.8
10 Mile Rd	H072	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H073	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
10 Mile Rd	H074	R018	Major	1977	6	0.7	0.5	1.5	1.5	4.2	2.0	8.4
Amherst Rd	H015	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Amherst Rd	H016	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Amherst Rd	H017	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Amherst Rd	H018	R028	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	H003	R016	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	H004	R016	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0

Street	Hydrant ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
Cambridge Blvd	H005	R016	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	H063	R003	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	H065	R016	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	H068	R003	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Cambridge Blvd	H076	R016	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Devonshire Rd	H024	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Devonshire Rd	H025	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Devonshire Rd	H026	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Devonshire Rd	H027	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Devonshire Rd	H077	R026	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Elm Park	H056	R006	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Elm Park	H057	R006	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Elm Park	H058	R006	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Elm Park Blvd	H044	R013	Local	2004	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Elm Park Blvd	H052	R013	Local	2004	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Elm Park Blvd	H053	R013	Local	2004	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Eprize Dr	H038	R035	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Fairwood Blvd	H006	R032	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Fairwood Blvd	H007	R032	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Fairwood Blvd	H008	R032	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Hanover Rd	H064	R004	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0

Street	Hydrant ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
Hanover Rd	H075	R004	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kenberton Dr	H054	R007	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kenberton Dr	H055	R007	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kensington Blvd	H028	R025	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kensington Blvd	H029	R025	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kensington Blvd	H030	R025	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Kensington Blvd	H031	R025	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Maywood Ave	H012	R034	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Maywood Ave	H013	R034	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Maywood Ave	H014	R034	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Millington Rd	H046	R011	Local	2000	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Millington Rd	H047	R011	Local	2000	8	0.5	0.8	0.5	1.0	2.8	1.5	4.2
Norwich Rd	H061	R005	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Norwich Rd	H062	R005	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Oakland Park Blvd	H043	R014	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Oakland Park Blvd	H070	R014	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Oakland Park Blvd	H071	R014	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Oxford Blvd	H041	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Oxford Blvd	H042	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Oxford Blvd	H066	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5
Oxford Blvd	H067	R015	Local	1920	10	1.5	0.0	0.5	1.0	3.0	3.5	10.5

Street	Hydrant ID	Run ID	Road Type	Year Installed	Diameter (in)	Consequence of Failure Criteria				Consequence of Failure (COF)	Probability of Failure (POF): Breaks/150 ft.	Criticality Score (BRE)
						Pipe Age	Pipe Size	Undersize Pipe	Road Type			
Poplar Park Blvd	H045	R012	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Poplar Park Blvd	H051	R012	Local	1985	6	0.6	0.5	1.0	1.0	3.1	2.0	6.2
Sylvan Ave	H009	R033	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Sylvan Ave	H010	R033	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Sylvan Ave	H011	R033	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Wellesley Dr	H019	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Wellesley Dr	H020	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Wellesley Dr	H021	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Wellesley Dr	H022	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Wellesley Dr	H023	R027	Local	2000	6	0.5	0.5	1.0	1.0	3.0	1.5	4.5
Woodside Park Blvd	H049	R008	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Woodside Park Blvd	H050	R008	Local	1920	8	1.5	0.8	0.5	1.0	3.8	3.5	13.3
Woodward Heights	H001	R031	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0
Woodward Heights	H002	R031	Local	1920	6	1.5	0.5	1.0	1.0	4.0	3.5	14.0

APPENDIX F: ENGINEER'S ESTIMATE OF COST - CAPITAL IMPROVEMENT PROJECTS

2020 Drinking Water Capital Improvement Plan Analysis

Year	Type of Construction (Full WM or LSL Only)	Street Name	From	To	Size of New Watermain	Size of Current Watermain	Length of Watermain	Year Watermain Built	Year Road Built	No. of Known / Suspected LSLs[1]	Ranking in 2015 Water Reliability Report	Business Risk Exposure (BRE) - From AMP[2]	Engineer's Estimate of Cost[3]
17	Full WM	Woodside Park Blvd	Oakdale	Ridge	8"	8"	1,350	1920	2005	26	N/A	13.3	$ 786,900.00
22	Full WM	Kenberton Dr	Oakdale	Ridge	8"	6"	1,360	1920	2011	16	N/A	14	$ 667,100.00
22	Full WM	Elm Park Ave	Oakdale	Ridge	8"	6"	1,350	1920	2009	5	N/A	14	$ 720,400.00
1	LSL Only	Elm Park Blvd[5]	Ridge	Woodward	8"	8"	1,475	2004	2005	13	N/A	4.2	$ 45,500.00
		Eprize Dr[6]	10 Mile Rd	South City Limit	8"	8"	445	2020	UNKNOWN	0	N/A	14	N/A
1	LSL Only	Millington Rd[5]	Ridge	Woodward	8"	8"	930	2000	2000	1	N/A	4.2	$ 3,500.00
24	Full WM	Norwich Rd	Oakdale	Ridge	8"	6"	1,360	1920	2017	22	N/A	14	$ 772,100.00
23	Full WM	Hanover Rd	Oakdale	Ridge	8"	6"	1,350	1920	2017	27	N/A	14	$ 808,200.00
25	Full WM	Cambridge Blvd W	Maplefield	Ridge	8"	6"	1,700	1920	2014	26	N/A	14	$ 990,100.00
4	Full WM	Oakdale Blvd	W 10 Mile Rd	Cambridge	8"	6"	2,160	1920	2007	56	N/A	14	$ 1,572,200.00
1	LSL Only	Maplefield Rd[5]	W 10 Mile Rd	South City Limit	8"	8"	2,325	1998	1996	5	N/A	4.2	$ 17,500.00
29	Full WM	Ridge Rd[4]	W 10 Mile Rd	South City Limit	12"	10"	2,420	1920	2018	18	3	14	$ 1,202,700.00
16	Full WM	Poplar Park Blvd	Ridge	Woodward	8"	6"	1,140	1920	2003	17	N/A	6.2	$ 676,500.00
28	Full WM	Oakland Park Blvd	Ridge	Woodward	8"	8"	1,680	1920	2000	17	N/A	13.3	$ 916,000.00
31	Full WM	Oxford Blvd	Ridge	Woodward	8"	10"	1,860	1920	2015	15	N/A	10.5	$ 1,189,100.00
27	Full WM	Cambridge Blvd	Ridge	Woodward	8"	6"	2,200	1920	1995	24	N/A	14	$ 1,272,600.00
2	Full WM	Kensington Blvd	South Main	Rail Road	8"	6"	2,050	1920	2003	74	N/A	14	$ 1,581,200.00
18	Full WM	Devonshire Rd	Woodward	Rail Road	8"	6"	2,260	1920	2008	45	N/A	6.2	$ 1,505,400.00
6	Full WM	Wellesley Dr	Woodward	Gainsboro	8"	6"	2,170	1920	2006	66	N/A	4.5	$ 1,602,400.00
8		Indiana	E 10 Mile Rd	Woodward Heights	8"	N/A	2,325	N/A	2018	N/A	4	N/A	$ 940,000.00
		Bermuda	Sylvan	Woodward Heights	8"	N/A	600	N/A	2018	N/A	5	N/A	$ 230,000.00
11	Full WM	Amherst Rd	Woodward	Gainsboro	8"	6"	2,050	1920	1995	38	N/A	14	$ 1,413,700.00
20	Full WM	Maywood Ave	Woodward	Gainsboro	8"	6"	2,060	1920	2012	50	N/A	14	$ 1,412,000.00
15	Full WM	Sylvan Ave	Woodward	East City Limit	8"	6"	2,000	1920	2001	50	N/A	14	$ 1,376,300.00
13	Full WM	Fairwood Blvd	Woodward	East City Limit	8"	6"	1,970	1920	2010	49	N/A	14	$ 1,321,700.00
9	Full WM	Woodward Heights Blvd	Woodward	East City Limit	8"	6"	1,900	1920	1998	38	N/A	14	$ 1,280,000.00
		Gainsboro St	North End	South End	8"	6"	2,000	1920	2001	0	N/A	14	$ 709,300.00
		SB Woodward	North City Limit	Elm Park Ave	12"	12"	1,225	1985	N/A	0	N/A	16.1	N/A
8		SB Woodward	Oakland Park	Elm Park	12"	N/A	600	N/A	N/A	0	N/A	N/A	$ 428,280.00
		SB Woodward	Oxford	South City Limit	12"	10"	750	1920	N/A	0	N/A	16.1	$ 500,000.00
1	LSL Only	NB Woodward[5]	North City Limit	Wellesley	12"	12"	3,229	1985	N/A	2	N/A	14	$ 7,000.00
		NB Woodward	Wellesley	Sylvan	12"	10"	800	1920	N/A	0	N/A	14	$ 570,000.00
		NB Woodward	Sylvan	Woodward Heights	12"	10"	600	1920	N/A	0	N/A	14	$ 430,000.00
		W 10 Mile Rd	West City Limit	Woodward	12"	12"	2,680	1985	N/A	0	N/A	7.6	NA
		E 10 Mile Rd	Woodward	East City Limit	12"	12"	2,800	1985	N/A	0	N/A	8.4	NA
		Gate Valve & Hydrant Inspection/Exercise	Entire City		N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	$ 50,000.00
		2nd SOCWA Supply[4]	W. 10 Mile Rd	Oakdale	N/A		N/A	N/A		N/A	1	N/A	$ 1,411,590.00

Note(s): [1]Information taken from preliminary distribution system material inventory as of 12/03/2020. [2]Business Risk Exposure (1-25) = Probability of Failure (1-5) x Consequence of Failure (1-5). Higher Scores indicate greater need to replace. Consequence of Failure = Pipe Age Factor x Pipe Size Factor x Undersize Pipe Factor x Road Type Factor. Probability of Failure = Pipe Age Factor. [3]Cost estimates were prepared in February of 2020 by AEW and rounded to the nearest hundred dollar. Costs include survey, design, construction and construction engineering. Construction work includes replacing all water services and any impacted pavement. [4]Projects were identified in the 2015 Water Reliability Report. [5]Lead service replacements only. Estimating $12,000 per lead service replacement. [6]Eprize Drive water main worked performed in 2020 was completed by a private development.

APPENDIX C

SEMCOG Community Profile

Community Profiles

YOU ARE VIEWING DATA FOR:

City of Pleasant Ridge

23925 Woodward Ave
Pleasant Ridge, MI
48069-1199
http://cityofpleasantridge.org

SEMCOG MEMBER

Census 2020 Population: 2,627
Area: 0.6 square miles

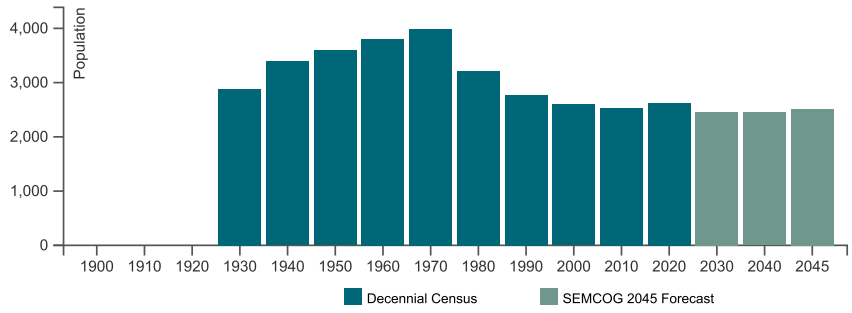
VIEW COMMUNITY EXPLORER MAP VIEW 2020 CENSUS MAP

Population and Households

Link to American Community Survey (ACS) Profiles: **Select a Year** 2016-2020 ▾ **Social** | **Demographic**

Population and Household Estimates for Southeast Michigan, 2021

Population Forecast



Note for City of Pleasant Ridge : Incorporated in 1926 from Village of Pleasant Ridge. No population numbers available prior to 1930 Census as village was not listed.

Population and Households

Population and Households	Census 2020	Census 2010	Change 2010-2020	Pct Change 2010-2020	SEMCOG Jul 2021	SEMCOG 2045
Total Population	2,627	2,526	101	4.0%	2,649	2,518
Group Quarters Population	0	0	0	-	0	0
Household Population	2,627	2,526	101	4.0%	2,649	2,518
Housing Units	1,152	1,153	-1	-0.1%	1,152	-
Households (Occupied Units)	1,111	1,115	-4	-0.4%	1,114	1,089
Residential Vacancy Rate	3.6%	3.3%	0.3%	-	3.3%	-
Average Household Size	2.36	2.27	0.10	-	2.38	2.31

Source: **U.S. Census Bureau** and **SEMCOG 2045 Regional Development Forecast**

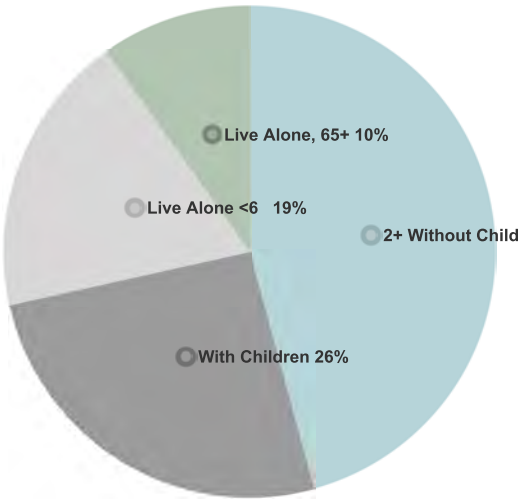
Components of Population Change

Components of Population Change	2000-2005 Avg.	2006-2010 Avg.	2011-2018 Avg.
Natural Increase (Births - Deaths)	18	11	11
Births	40	30	29
Deaths	22	19	18
Net Migration (Movement In - Movement Out)	-62	19	-17
Population Change (Natural Increase + Net Migration)	-44	30	-6

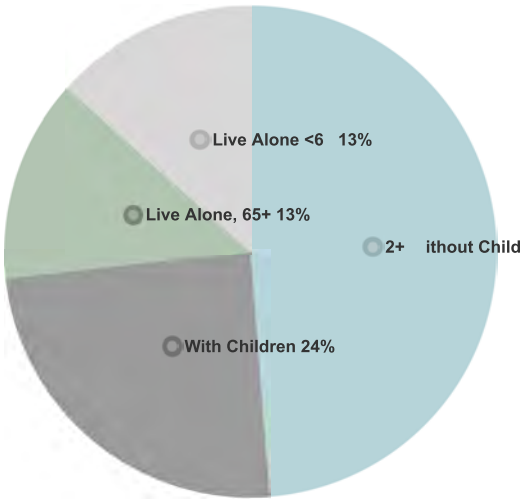
Source: **Michigan Department of Community Health Vital Statistics**, **U.S. Census Bureau**, and SEMCOG

ousehold Types

CS
2019



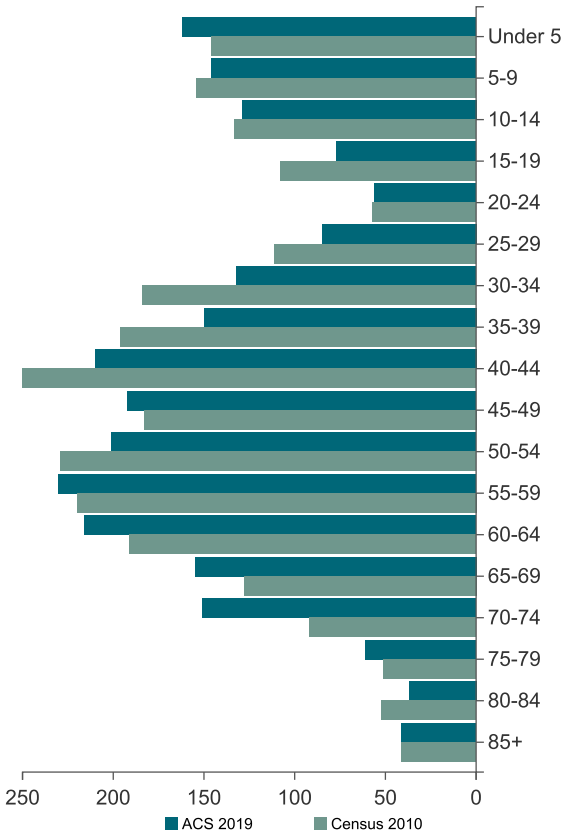
SE CO
204



ousehold Types	Census 2010	CS 2019	Change 2010-2019	Pct Change 2010-2019	SE CO 2045
ith Seniors 65+	263	321	58	22.1%	542
ithout Seniors	852	750	-102	-12%	547
Live Alone, 65+	105	106	1	1%	146
Live Alone, <65	212	199	-13	-6.1%	146
2+ Persons, With children	297	276	-21	-7.1%	266
2+ Persons, Without children	501	490	-11	-2.2%	531
Total Households	1,115	1,071	-44	-3.9%	1,089

Source: **U.S. Census Bureau**, **Decennial Census**, **2015-2019 American Community Survey 5-Year Estimates**, and **SEMCOG 2045 Regional Development Forecast**

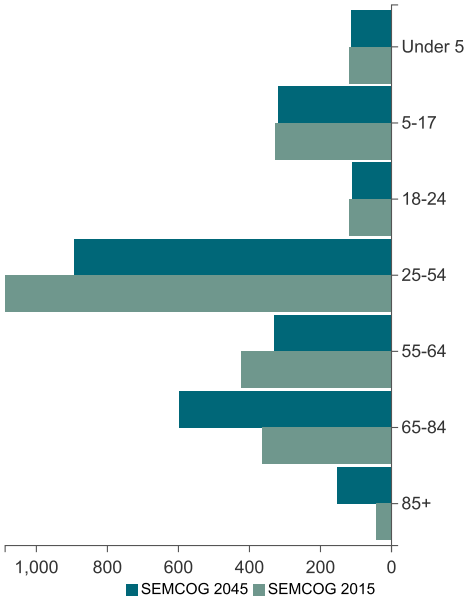
Population Change by Age, 2010-2019



Age Group	Census 2010	Change 2000-2010	ACS 2019	Change 2010-2019
Under 5	146	-20	162	16
5-9	154	-9	146	-8
10-14	133	-27	129	-4
15-19	108	-10	77	-31
20-24	57	-7	56	-1
25-29	111	-28	85	-26
30-34	184	-73	132	-52
35-39	196	-9	150	-46
40-44	250	-15	210	-40
45-49	183	-84	192	9
50-54	229	-2	201	-28
55-59	220	68	230	10
60-64	191	80	216	25
65-69	128	66	155	27
70-74	92	8	151	59
75-79	51	-23	61	10
80-84	52	16	37	-15
85+	41	1	41	0
Total	2,526	-68	2,431	-95
Median Age	43.4	2.9	46.5	3.1

Source: **U.S. Census Bureau**, **Decennial Census**, and **2015-2019 American Community Survey 5-Year Estimates**

Forecasted Population Change 2015-2045



Age Group	2015	2020	2025	2030	2035	2040	2045	Change 2015 - 2045	Pct Change 2015 - 2045
Under 5	120	101	104	121	117	105	113	-7	-5.8%
5-17	327	300	296	293	320	314	319	-8	-2.4%
18-24	119	147	127	111	97	97	110	-9	-7.6%
25-54	1,088	953	931	911	886	882	894	-194	-17.8%
55-64	424	404	387	333	312	312	331	-93	-21.9%
65-84	366	445	551	624	646	618	598	232	63.4%
85+	45	45	51	69	90	121	153	108	240%
Total	2,489	2,395	2,447	2,462	2,468	2,449	2,518	29	1.2%

Source: **SEMCOG 2045 Regional Development Forecast**

Older Adults and Youth Populations

Older Adults and Youth Population	Census 2010	ACS 2019	Change 2010-2019	Pct Change 2010-2019	SEMCOG 2045
60 and over	555	661	106	19.1%	920
65 and over	364	445	81	22.3%	751
65 to 84	323	404	81	25.1%	598
85 and Over	41	41	0	0%	153
Under 18	514	484	-30	-5.8%	432
5 to 17	368	322	-46	-12.5%	319
Under 5	146	162	16	11%	113

Note: Population by age changes over time because of the aging of people into older age groups, the movement of people, and the occurrence of births and deaths.

Source: **U.S. Census Bureau**, **Decennial Census**, **2015-2019 American Community Survey 5-Year Estimates**, and **SEMCOG 2045 Regional Development Forecast**

Race and Hispanic Origin

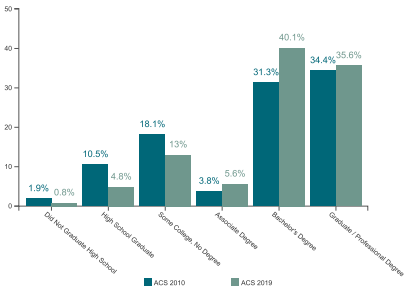
Race and Hispanic Origin	Census 2010	Percent of Population 2010	Census 2020	Percent of Population 2020	Percentage Point Change 2010-2020
Non-Hispanic	2,482	98.3%	2,550	97.1%	-1.2%
White	2,359	93.4%	2,335	88.9%	-4.5%
Black	48	1.9%	41	1.6%	-0.3%
Asian	27	1.1%	31	1.2%	0.1%
Multi-Racial	43	1.7%	137	5.2%	3.5%
Other	5	0.2%	6	0.2%	0%
Hispanic	44	1.7%	77	2.9%	1.2%
Total	2,526	100%	2,627	100%	0%

Source: **U.S. Census Bureau Decennial Census**

Highest Level of Education

Highest Level of Education*	ACS 2010	ACS 2019	Percentage Point Chg 2010-2019
Did Not Graduate High School	1.9%	0.8%	-1.1%
High School Graduate	10.5%	4.8%	-5.7%
Some College, No Degree	18.1%	13%	-5.1%
Associate Degree	3.8%	5.6%	1.8%
Bachelor's Degree	31.3%	40.1%	8.8%
Graduate / Professional Degree	34.4%	35.6%	1.3%

* Population age 25 and over

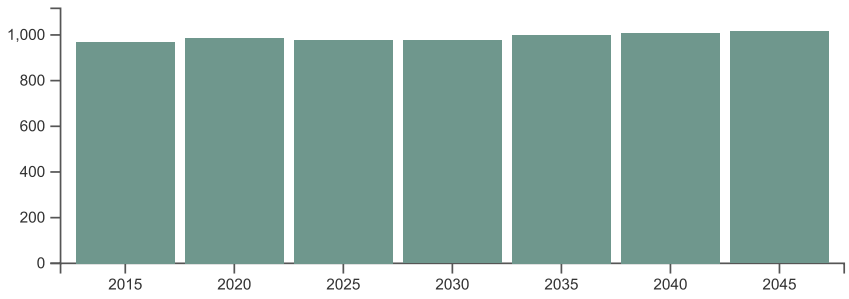


Source: **U.S. Census Bureau, 2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

Economy & Jobs

Link to American Community Survey (ACS) Profiles: **Select a Year** 2016-2020 ▾ **Economic**

Forecasted Jobs



Source: **SEMCOG 2045 Regional Development Forecast**

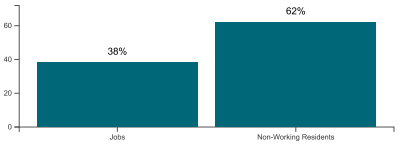
Forecasted Jobs by Industry Sector

Forecasted Jobs By Industry Sector	2015	2020	2025	2030	2035	2040	2045	Change 2015-2045	Pct Change 2015-2045
Natural Resources, Mining, & Construction	51	54	52	51	51	52	52	1	2%
Manufacturing	64	61	58	54	51	48	46	-18	-28.1%
Wholesale Trade	15	16	16	15	15	15	15	0	0%
Retail Trade	49	55	48	49	47	44	43	-6	-12.2%
Transportation, Warehousing, & Utilities	9	10	9	9	10	10	10	1	11.1%
Information & Financial Activities	164	168	166	164	165	168	169	5	3%
Professional and Technical Services & Corporate HQ	290	282	287	292	305	306	306	16	5.5%
Administrative, Support, & Waste Services	111	116	117	118	120	123	125	14	12.6%
Education Services	57	59	59	59	60	62	64	7	12.3%
Healthcare Services	50	54	57	59	64	70	74	24	48%
Leisure & Hospitality	34	35	34	32	39	38	39	5	14.7%
Other Services	57	58	57	56	56	55	54	-3	-5.3%
Public Administration	18	18	18	18	18	18	18	0	0%
Total Employment Numbers	969	986	978	976	1,001	1,009	1,015	46	4.7%

Source: **SEMCOG 2045 Regional Development Forecast**

Daytime Population

Daytime Population	ACS 2016
Jobs	670
Non-Working Residents	1,090
Age 15 and under	441
Not in labor force	569
Unemployed	80
Daytime Population	1,760



Source: **2012-2016 American Community Survey 5-Year Estimates** and **2012-2016 Census Transportation Planning Products Program (CTPP)**. For additional information, visit SEMCOG's **Interactive Commuting Patterns Map**

Note: The number of residents attending school outside Southeast Michigan is not available. Likewise, the number of students commuting into Southeast Michigan to attend school is also not known.

here orkers Co te From 2016

Rank	here Workers Co mute Fro *	orkers	Percent
1	Pleasant Ridge	154	23%
2	Detroit	102	15.2%
3	erndale	51	7.6%
4	Lake Angelus	46	6.9%
5	Troy	45	6.7%
6	Royal Oak	39	5.8%
7	Hazel Park	34	5.1%
8	South Lyon	23	3.4%
9	arren	23	3.4%
10	Bloomfield Twp	17	2.5%
-	Elsewhere	136	20.3%
* Workers, age 16 and over employed in Pleasant Ridge		**670**	**100%**

Source: U.S. Census Bureau - 2012-2016 CTPP/ACS Commuting Data and Com ting Patterns in Southeast Michigan

Where Residents Work 2016

Rank	here Residents Work *	Workers	Percent
1	Detroit	370	26.4%
2	Pleasant Ridge	154	11%
3	Auburn Hills	109	7.8%
4	Troy	106	7.6%
5	Southfield	63	4.5%
6	erndale	56	4%
7	arren	54	3.9%
8	Royal Oak	53	3.8%
9	armington Hills	47	3.4%
10	Birmingham	45	3.2%
-	Elsewhere	345	24.6%
* Workers, age 16 and over residing in Pleasant Ridge		**1,402**	**100%**

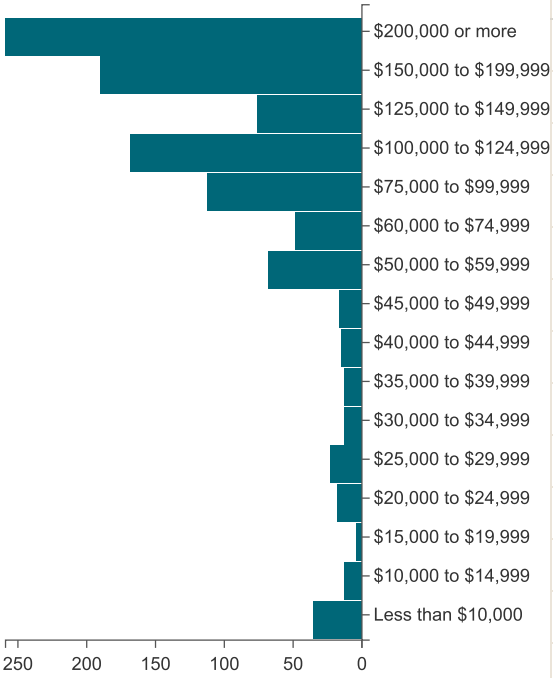
Source: U.S. Census Bureau - 2012-2016 CTPP/ACS Commuting Data and Com uting Patterns in Southeast Michigan

Household Income

Income (in 2019 dollars)	ACS 2010	ACS 2019	Change 2010-2019	Percent Change 2010-2019
Median Household Income	$124,571	$122,813	$-1,758	-1.4%
Per Capita Income	$68,238	$70,062	$1,824	2.7%

Source: **U.S. Census Bureau**, **2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

Annual Household Income



Annual Household Income	ACS 2019
$200,000 or more	259
$150,000 to $199,999	190
$125,000 to $149,999	76
$100,000 to $124,999	168
$75,000 to $99,999	112
$60,000 to $74,999	48
$50,000 to $59,999	68
$45,000 to $49,999	16
$40,000 to $44,999	15
$35,000 to $39,999	13
$30,000 to $34,999	13
$25,000 to $29,999	23
$20,000 to $24,999	18
$15,000 to $19,999	4
$10,000 to $14,999	13
Less than $10,000	35
Total	**1,071**

Source: **U.S. Census Bureau**, **2015-2019 American Community Survey 5-Year Estimates**

Poverty

Poverty	ACS 2010	% of Total (2010)	ACS 2019	% of Total (2019)	% Point Chg 2010-2019
Persons in Poverty	80	3.1%	95	3.9%	0.8%
Households in Poverty	30	2.7%	48	4.5%	1.8%

Source: **U.S. Census Bureau**, **2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

Housing

Link to American Community Survey (ACS) Profiles: **Select a Year** 2016-2020 ▾ **Housing**

Building Permits 2000 - 2021

Year	Single Family	Two Family	Attach Condo	Multi Family	Total Units	Total Demos	Net Total
2000	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0
2003	1	0	0	0	1	0	1
2004	2	0	12	0	14	1	13
2005	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	1	-1
2013	0	0	0	0	0	0	0
2014	2	0	0	0	2	2	0
2015	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0
2017	1	0	0	0	1	0	1
2018	0	0	0	0	0	0	0
2019	1	0	0	0	1	1	0
2020	0	0	0	0	0	0	0
2021	2	0	0	0	2	0	2
2000 to 2021 totals	9	0	12	0	21	5	16

Source: **SEMCOG Development**

Note: Permit data for most recent years may be incomplete and is updated monthly.

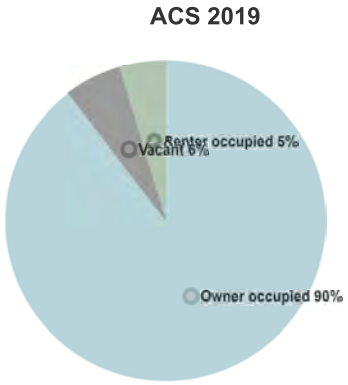
Housing Types

Housing Type	ACS 2010	ACS 2019	Change 2010-2019	New Units Permitted Since 2018
Single Unit	1,144	1,104	-40	4
Multi-Unit	34	32	-2	0
Mobile Homes or Other	0	0	0	0
Total	1,178	1,136	-42	4
Units Demolished				-1
Net (Total Permitted Units - Units Demolished)				3

Source: **U.S. Census Bureau**, **2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**, **SEMCOG Development**

Housing Tenure

Housing Tenure	Census 2010	ACS 2019	Change 2010-2019
Owner occupied	1,031	1,018	-13
Renter occupied	84	53	-31
Vacant	38	65	27
Seasonal/migrant	2	0	-2
Other vacant units	36	65	29
Total Housing Units	1,153	1,136	-17



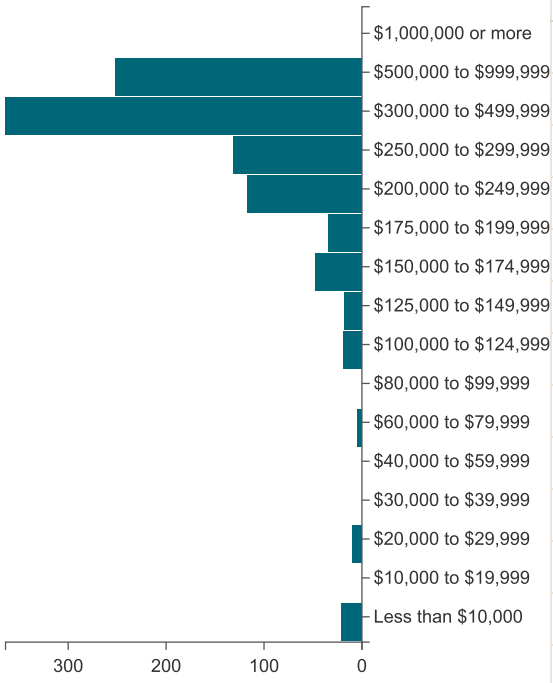
Source: **U.S. Census Bureau**, **2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

Housing Value and Rent

Housing Value (in 2019 dollars)	ACS 2010	ACS 2019	Change 2010-2019	Percent Change 2010-2019
Median housing value	$342,131	$346,100	$3,969	1.2%
Median gross rent	$1,268	$1,445	$177	14%

Source: **U.S. Census Bureau**, **Census 2000**, **2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

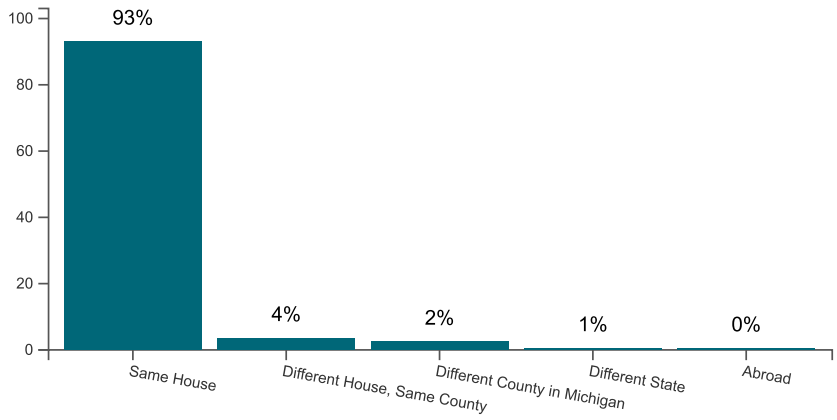
Housing Value



Housing Value	ACS 2019
$1,000,000 or more	0
$500,000 to $999,999	252
$300,000 to $499,999	364
$250,000 to $299,999	131
$200,000 to $249,999	117
$175,000 to $199,999	34
$150,000 to $174,999	47
$125,000 to $149,999	18
$100,000 to $124,999	19
$80,000 to $99,999	0
$60,000 to $79,999	5
$40,000 to $59,999	0
$30,000 to $39,999	0
$20,000 to $29,999	10
$10,000 to $19,999	0
Less than $10,000	21
Owner-Occupied Units	1,018

Source: **U.S. Census Bureau**, **2015-2019 American Community Survey 5-Year Estimates**

Residence One Year Ago *



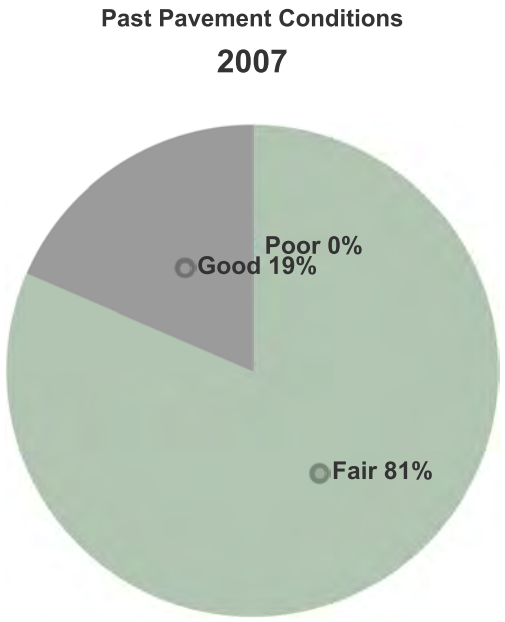
* This table represents persons, age 1 and over, living in City of Pleasant Ridge from 2015-2019. The table does not represent person who moved out of City of Pleasant Ridge from 2015-2019.

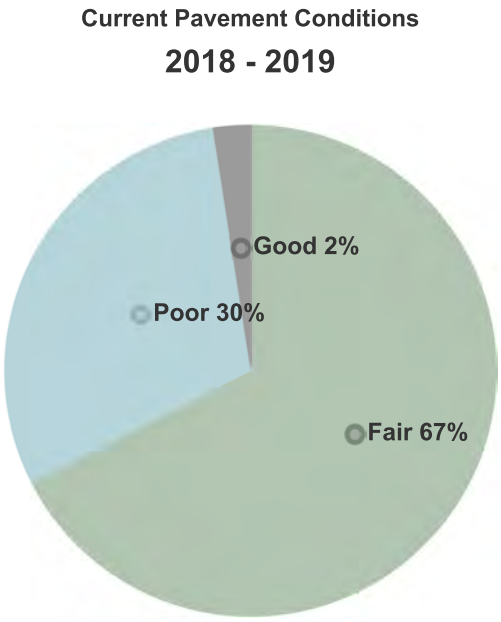
Source: **U.S. Census Bureau**, **2015-2019 American Community Survey 5-Year Estimates**

Transportation

Miles of public road (including boundary roads): 14
Source: **Michigan Geographic Framework**

Pavement Condition (in Lane Miles)



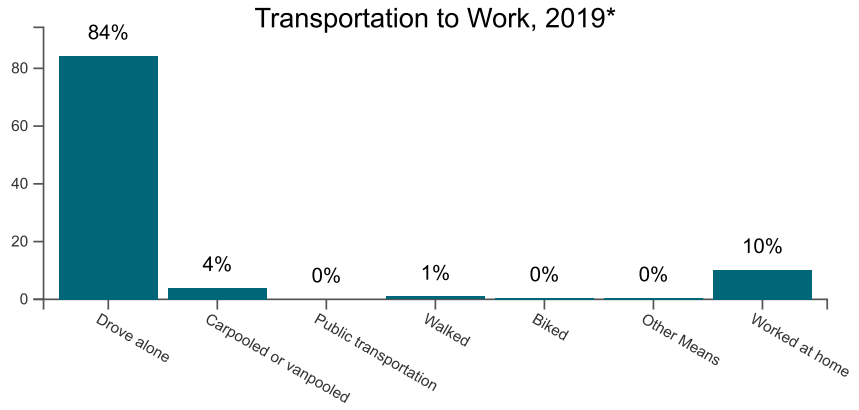


Note: Poor pavements are generally in need of rehabilitation or full reconstruction to return to good condition. Fair pavements are in need of capital preventive maintenance to avoid deteriorating to the poor classification. Good pavements generally receive only routine maintenance, such as street sweeping and snow removal, until they deteriorate to the fair condition.
Source: **SEMCOG**

Bridge Status

Bridge Status	2008	2008 (%)	2009	2009 (%)	2010	2010 (%)	Percent Point Chg 2008-2010
Open	7	100%	7	100%	7	100%	0%
Open with Restrictions	0	0%	0	0%	0	0%	0%
Closed*	0	0%	0	0%	0	0%	0%
Total Bridges	7	100.0%	7	100.0%	7	100.0%	0.0%
Deficient Bridges	2	28.6%	2	28.6%	2	28.6%	0%

* Bridges may be closed because of new construction or failed condition.
Note: A bridge is considered deficient if it is structurally deficient (in poor shape and unable to carry the load for which it was designed) or functionally obsolete (in good physical condition but unable to support current or future demands, for example, being too narrow to accommodate truck traffic).
Source: Michigan Structure Inventory and Appraisal Database
Detailed Intersection & Road Data



* Resident workers age 16 and over

Transportation to Work

Transportation to Work	ACS 2010	% of Total (ACS 2010)	ACS 2019	% of Total (ACS 2019)	% Point Chg 2010-2019
Drove alone	1,266	91.1%	1,093	84.2%	-6.9%
Carpooled or vanpooled	42	3%	51	3.9%	0.9%
Public transportation	8	0.6%	0	0%	-0.6%
Walked	12	0.9%	12	0.9%	0%
Biked	0	0%	5	0.4%	0.4%
Other Means	0	0%	5	0.4%	0.4%
Worked at home	61	4.4%	132	10.2%	5.8%
Resident workers age 16 and over	1,389	100.0%	1,298	100.0%	0.0%

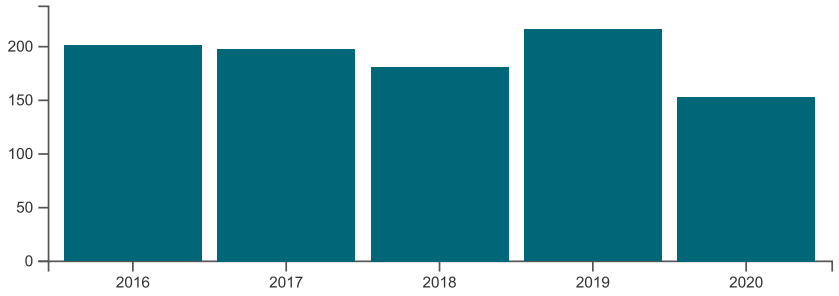
Source: **U.S. Census Bureau**, **2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

Mean Travel Time to Work

Mean Travel Time To Work	ACS 2010	ACS 2019	Change 2010-2019
For residents age 16 and over who worked outside the home	22.1 minutes	22.8 minutes	0.7 minutes

Source: **U.S. Census Bureau**, **2006-2010 and 2015-2019 American Community Survey 5-Year Estimates**

Crashes, 2016-2020



Source: **Michigan Department of State Police with the Criminal Justice Information Center** and **SEMCOG**
Note: Crash data shown is for the entire city.

Crash Severity

Crash Severity	2016	2017	2018	2019	2020	Percent of Crashes 2016 - 2020
Fatal	0	0	0	0	2	0.2%
Serious Injury	2	1	1	0	1	0.5%
Other Injury	27	37	26	31	15	14.3%
Property Damage Only	172	160	154	185	135	84.9%
Total Crashes	201	198	181	216	153	100%

Crashes by Type

Crashes by Type	2016	2017	2018	2019	2020	Percent of Crashes 2016 - 2020
Head-on	1	1	0	3	0	0.5%
Angle or Head-on/Left-turn	29	28	36	33	29	16.3%
Rear-End	78	78	77	84	48	38.5%
Sideswipe	62	73	50	75	48	32.5%
Single Vehicle	12	6	7	12	15	5.5%
Backing	0	4	2	4	5	1.6%
Other or Unknown	19	8	9	5	8	5.2%

Crashes by Involvement

Crashes by Involvement	2016	2017	2018	2019	2020	Percent of Crashes 2016 - 2020
Red-light Running	10	7	16	14	16	6.6%
Lane Departure	13	12	10	15	15	6.8%
Alcohol	3	9	5	4	4	2.6%
Drugs	1	2	3	0	1	0.7%
Deer	0	0	0	0	0	0%
Train	0	0	0	0	0	0%
Commercial Truck/Bus	9	14	6	17	14	6.3%
School Bus	0	1	0	0	0	0.1%
Emergency Vehicle	0	0	1	1	2	0.4%
Motorcycle	0	0	1	1	2	0.4%
Intersection	102	79	77	78	65	42.3%
Work Zone	8	2	1	17	3	3.3%
Pedestrian	0	0	2	0	1	0.3%
Bicyclist	3	1	1	2	2	0.9%
Distracted Driver	8	15	17	18	14	7.6%
Older Driver (65 and older)	24	28	33	45	18	15.6%
Young Driver (16 to 24)	65	48	53	65	38	28.3%
Secondary	0	0	0	0	0	0%

High Frequency Intersection Crash Rankings

Local Rank	County Rank	Region Rank	Intersection	Annual Avg 2016-2020
1	20	40	Main S @ 10 Mile Rd E	40.4
2	136	370	10 Mile Rd W @ S M 1/E I 696 Ramp	20.6
3	368	1,110	Woodward Ave @ 10 Mile Rd W	12
4	448	1,343	Woodward Ave @ 10 Mile Rd W	10.6
5	581	1,820	E I 696 @ S M 1/E I 696 Ramp	8.8
6	581	1,820	E M 1 Service Drive @ 10 Mile Rd W	8.8
7	784	2,495	Woodward Ave @ Oakland Park	7
8	1105	3,649	E I 696 @ E M 1 Service Drive	5.2
9	1152	3,822	Woodward Ave @ Oxford	5
10	1326	4,458	Woodward Ave @ Fairwood	4.4

Note: Intersections are ranked by the number of reported crashes, which does not take into account traffic volume. Crashes reported occurred within 150 feet of the intersection.

Source: **Michigan Department of State Police with the Criminal Justice Information Center** and **SEMCOG**

High Frequency Road Segment Crash Rankings

Local Rank	County Rank	Region Rank	Segment	From Road - To Road	Annual Avg 2016-2020
1	181	482	10 Mile Rd W	Coolidge/E I 696 Ramp - E I 696/M 1 Ramp	30
2	213	580	Woodward Ave	Oakland Park - Withington	28
3	476	1,239	10 Mile Rd W	W M 1 Service Drive - Main S	19.2
4	646	1,755	10 Mile Rd W	S M 1/E I 696 Ramp - E M 1 Service Drive	15.8
5	661	1,793	10 Mile Rd W	E I 696/M 1 Ramp - S M 1/E I 696 Ramp	15.6
6	692	1,902	Main St S	W M 1 Service Drive - 10 Mile Rd E	15
7	757	2,119	E I 696	S M 1/E I 696 Ramp - E M 1 Service Drive	14
8	777	2,176	Woodward Ave	Woodward Heights Blvd - Vester	13.8
9	990	2,947	E I 696	E I 696/M 1 Ramp - S M 1/E I 696 Ramp	11
10	1061	3,234	W I 696	M 1/W I 696 Ramp - S M 1/E I 696 Ramp	10.2

Note: Segments are ranked by the number of reported crashes, which does not take into account traffic volume.

Environment

SEMCOG 2020 Land Use

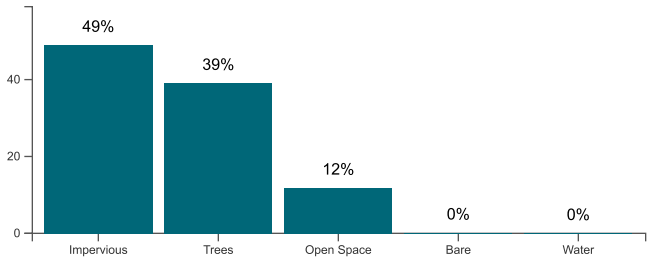
Parcel Land Use	Acres 2015	Acres 2020	Change 2015-2020	Pct Change 2015-2020
Single-Family Residential	220.1	220.5	0.4	0.2%
Attached Condo Housing	0.3	0.3	0	0%
Multi-Family Housing	0.5	0.2	-0.3	-62.7%
Mobile Home	0	0	0	0%
Agricultural/Rural Residential	0	0	0	0%
Mixed Use	0	0.3	0.3	-
Retail	1.5	2	0.5	31.9%
Office	2.8	2.3	-0.5	-16.8%
Hospitality	0.2	0.2	0	0%
Medical	0.1	0.1	0	0%
Institutional	4	3.5	-0.5	-13.1%
Industrial	6.9	6.9	0	0%
Recreational/Open Space	9.7	8.8	-0.9	-9.4%
Cemetery	0	0	0	0%
Golf Course	0	0	0	0%
Parking	2.2	2.2	0	0%
Extractive	0	0	0	0%
TCU	0.8	0.8	0	0%
Vacant	4.6	5.6	1	22.5%
Water	0	0	0	0%
Not Parceled	109.1	109.1	0	0%
Total	362.9	362.9	0	0%

1. **Agricultural / Rural Res** includes any residential parcel containing 1 or more homes where the parcel is 3 acres or larger.
2. **Mixed Use** includes those parcels containing buildings with Hospitality, Retail, or Office square footage and housing units.
3. **Not Parceled** includes all areas within a community that are not covered by a parcel legal description.
4. Parcels that do not have a structure assigned to the parcel are considered vacant unless otherwise indicated, even if the parcel is part of a larger development such as a factory, school, or other developed series of lots.

Note: Land Cover was derived from SEMCOG's 2010 Leaf off Imagery.

Source: **SEMCOG**

SEMCOG Land Cover in 2010



Source Data

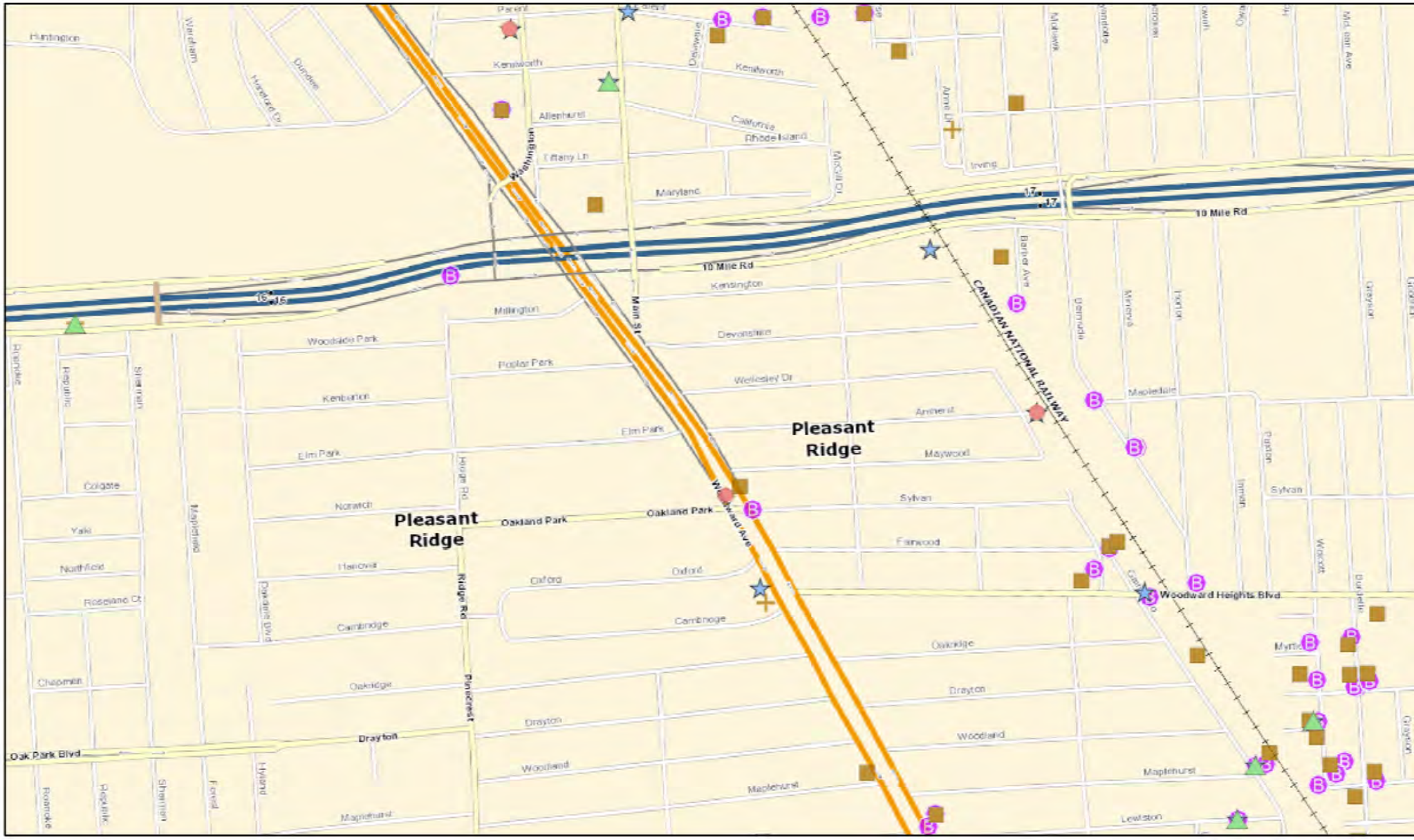
SEMCOG - Detailed Data

Type	Description	Acres	Percent
Impervious	buildings, roads, driveways, parking lots	176.7	49%
Trees	woody vegetation, trees	140.9	39.1%
Open Space	agricultural fields, grasslands, turfgrass	42.6	11.8%
Bare	soil, aggregate piles, unplanted fields	0.5	0.1%
Water	rivers, lakes, drains, ponds	0	0%
Total Acres		360.7	

APPENDIX D

Contaminated Sites RRD List

Environmental Mapper



April 4, 2022

- Baseline Environmental Assessment
- Closed Tanks
- Active Tanks
- Sites of Environmental Contamination (Part 201)
- Open
- Closed

1:10,611

0 0.07 0.15 0.3 mi

0 0.13 0.25 0.5 km

Map by: State of Michiga

Facility Name	Facility ID	Address	Details
Marathon Unit #1630	00021602	23928 Woodward Avenue	2 Underground Storage Tanks
Talon Homes	63500499	23940-24000 Woodward Avenue	Part 201 Contamination, Pollutants are null
Talon Homes		24000 Woodward Avenue	Baseline Environmental Assesment Site 200402318LV
Rowleys Lube Centers Inc	00014644	23733 Woodward Avenue	Underground Storage Tank
Sunny's Food Mart Inc	00002260	23701 Woodward Avenue	Underground Storage Tank
City of Pleasant Ridge DPW	00000898	92 Amherst Road	2 Underground Storage Tanks
Iron Ridge Holdings LLC		660 E 10 Mile Road	Baseline Environmental Assesment Site B201606842LV
Iron Ridge Holdings LLC		660 E 10 Mile Road	Baseline Environmental Assesment Site 6842
Gte Walmet	63005570	404 E 10 Mile Road	Part 201 Contamination, Pollutants are null
Gte Walmet	00006750	404 E 10 Mile Road	Underground Storage Tank

APPENDIX E

Soil Reference Report

United States Department of Agriculture

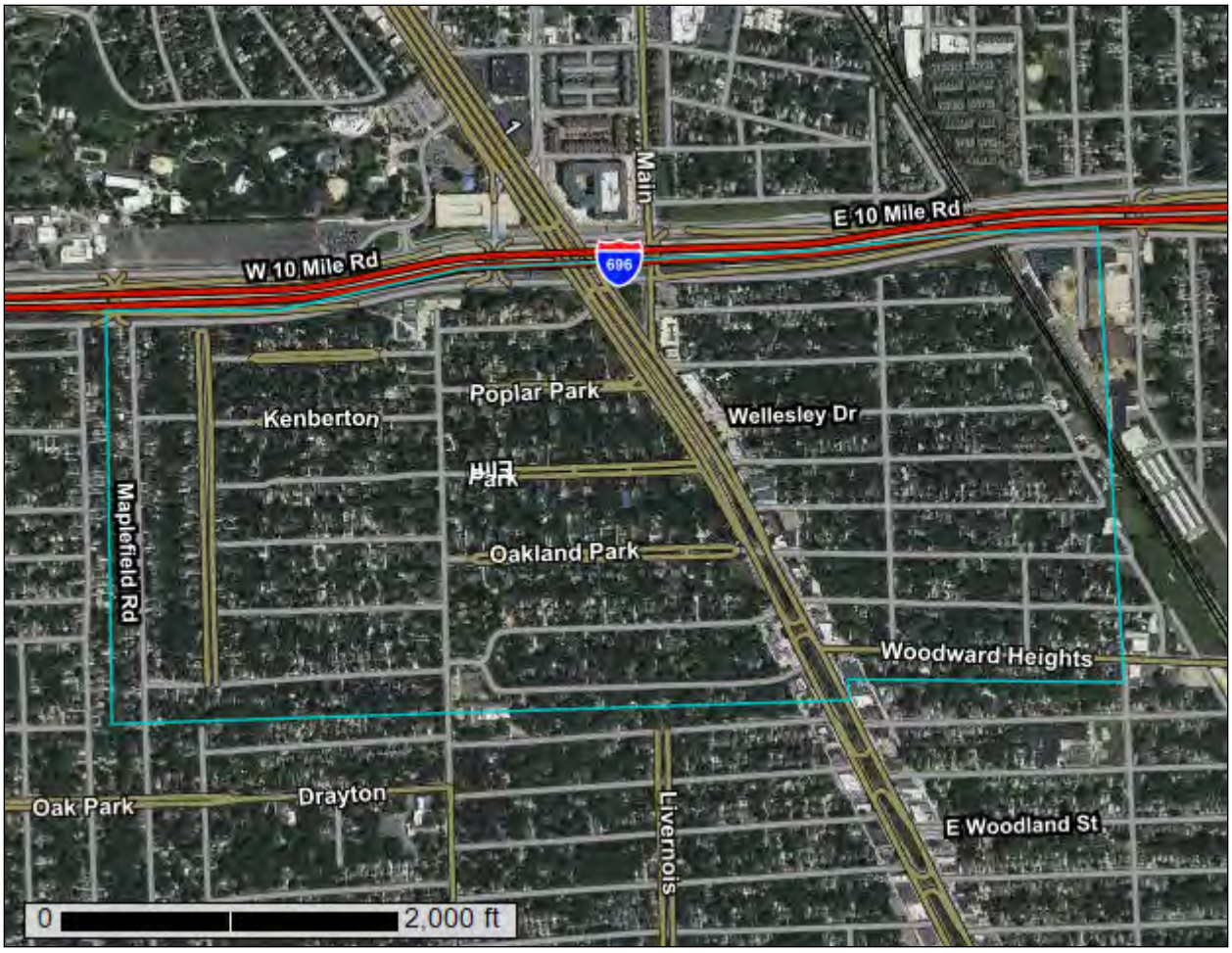
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Oakland County, Michigan

City of Pleasant Ridge Soil Information



March 30, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Oakland County, Michigan
Survey Area Data: Version 20, Sep 2, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 5, 2020—Aug 12, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
62B	Urban land-Spinks complex, 0 to 8 percent slopes	65.4	18.5%
63A	Urban land-Thetford complex, 0 to 3 percent slopes	59.9	17.0%
BrmuaB	Brems-Urban land complex, 0 to 4 percent slopes	80.8	22.9%
EtmaaE	Udorthents and Udipsamments, nearly level to hilly	8.6	2.4%
FrtaaB	Fortress family, 0 to 6 percent slopes	0.5	0.2%
PlfuaB	Plainfield-Urban land complex, 0 to 4 percent slopes	2.4	0.7%
TedubB	Tedrow-Urban land complex, dense substratum, 0 to 4 percent slopes	95.1	26.9%
UrbaoB	Urban land-Fortress family complex, 0 to 4 percent slopes	23.7	6.7%
UrbapB	Urban land-Fortress family complex, dense substratum, 0 to 4 percent slopes	16.3	4.6%
Totals for Area of Interest		**352.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties

and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Oakland County, Michigan

62B—Urban land-Spinks complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 6bjn
Elevation: 660 to 980 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 155 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Spinks and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spinks

Setting

Landform: Knolls on moraines, knolls on outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy and/or loamy glaciofluvial deposits

Typical profile

H1 - 0 to 9 inches: loamy sand
H2 - 9 to 26 inches: sand
H3 - 26 to 60 inches: loamy sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Thetford

Percent of map unit: 3 percent
Landform: Flats on outwash plains, flats on lake plains, drainageways on outwash plains, drainageways on lake plains

Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Selfridge

Percent of map unit: 3 percent
Landform: Drainageways on moraines, flats on moraines
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Riddles

Percent of map unit: 3 percent
Landform: Knolls on moraines
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F111BY503IN - Till Ridge
Hydric soil rating: No

Wasepi

Percent of map unit: 1 percent
Landform: Drainageways on outwash plains, flats on outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R111BY402IN - Dry Outwash Integrade
Hydric soil rating: No

63A—Urban land-Thetford complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 6bjq
Elevation: 660 to 980 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 155 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Thetford and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Thetford

Setting

Landform: Flats on outwash plains, flats on lake plains, drainageways on outwash plains, drainageways on lake plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy glaciofluvial deposits

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 20 inches: loamy fine sand
H3 - 20 to 45 inches: loamy sand
H4 - 45 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F099XY003MI - Warm Moist Sandy Depression
Hydric soil rating: No

Minor Components

Houghton

Percent of map unit: 5 percent
Landform: Depressions on till plains, depressions on outwash plains, depressions on moraines
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Granby

Percent of map unit: 5 percent
Landform: Depressions on lake plains, depressions on outwash plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Adrian

Percent of map unit: 5 percent

Landform: Depressions on outwash plains, depressions on moraines, depressions on till plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

BrmuaB—Brems-Urban land complex, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2tx6s
Elevation: 570 to 710 feet
Mean annual precipitation: 28 to 38 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 135 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Brems, human transported surface, and similar soils: 55 percent
Urban land: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brems, Human Transported Surface

Setting

Landform: Deltas, nearshore zones (relict), raised beaches, water-lain moraines
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Sandy human-transported material over sandy glaciolacustrine deposits

Typical profile

^Au - 0 to 9 inches: loamy sand
^Cu - 9 to 12 inches: sand
Ab - 12 to 19 inches: loamy sand
Bwb - 19 to 42 inches: sand
C - 42 to 80 inches: sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 36 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent

Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.5 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Ecological site: F099XY003MI - Warm Moist Sandy Depression
Hydric soil rating: No

Description of Urban Land

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Plainfield, human transported surface

Percent of map unit: 7 percent
Landform: Deltas, raised beaches, water-lain moraines, nearshore zones (relict)
Microfeatures of landform position: Rises
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Tedrow, human transported surface

Percent of map unit: 3 percent
Landform: Raised beaches, water-lain moraines, deltas, nearshore zones (relict)
Microfeatures of landform position: Open depressions
Down-slope shape: Linear, concave
Across-slope shape: Convex, linear
Hydric soil rating: No

EtmaaE—Udorthents and Udipsamments, nearly level to hilly

Map Unit Setting

National map unit symbol: 2m785
Elevation: 680 to 1,000 feet
Mean annual precipitation: 31 to 32 inches

Mean annual air temperature: 47 to 47 degrees F
Frost-free period: 137 to 179 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 60 percent
Udipsamments and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform: Ground moraines
Landform position (three-dimensional): Rise
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

A - 0 to 8 inches: silt loam
C - 8 to 39 inches: clay loam
Cd - 39 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Hydrologic Soil Group: C
Ecological site: F099XY007MI - Lake Plain Flats
Hydric soil rating: No

Description of Udipsamments

Setting

Landform: Ground moraines
Landform position (three-dimensional): Rise
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Sandy glaciofluvial deposits

Typical profile

A - 0 to 4 inches: fine sandy loam
C1 - 4 to 12 inches: loamy fine sand
C2 - 12 to 30 inches: loamy fine sand
C3 - 30 to 80 inches: gravelly loamy fine sand

Properties and qualities

Slope: 0 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Hydrologic Soil Group: A
Ecological site: F099XY004MI - Warm Dry Sandy Ridge
Hydric soil rating: No

FrtaaB—Fortress family, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2tx7w
Elevation: 570 to 710 feet
Mean annual precipitation: 28 to 38 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 135 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Fortress family and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fortress Family

Setting

Landform: Nearshore zones (relict), water-lain moraines
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Sandy human-transported material

Typical profile

^Au - 0 to 9 inches: loamy sand
^Cu - 9 to 80 inches: gravelly-artifactual sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 36 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.5 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Ecological site: F099XY003MI - Warm Moist Sandy Depression
Hydric soil rating: No

Minor Components

Urban land

Percent of map unit: 5 percent
Hydric soil rating: No

Riverfront

Percent of map unit: 4 percent
Landform: Nearshore zones (relict), water-lain moraines
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Riverfront, steep

Percent of map unit: 1 percent
Landform: Nearshore zones (relict), water-lain moraines
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

PlfuaB—Plainfield-Urban land complex, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2tx6q
Elevation: 570 to 680 feet
Mean annual precipitation: 28 to 38 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 135 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Plainfield, human transported surface, and similar soils: 60 percent
Urban land: 35 percent

Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Plainfield, Human Transported Surface

Setting

Landform: Nearshore zones (relict), raised beaches, deltas, water-lain moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex, concave
Parent material: Sandy human-transported material over sandy glaciolacustrine deposits

Typical profile

^Au - 0 to 9 inches: loamy sand
^Cu - 9 to 12 inches: sand
Bwb - 12 to 45 inches: sand
C - 45 to 80 inches: sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.5 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Ecological site: F099XY004MI - Warm Dry Sandy Ridge
Hydric soil rating: No

Description of Urban Land

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Brems, human transported surface

Percent of map unit: 5 percent
Landform: Nearshore zones (relict), raised beaches, deltas, water-lain moraines
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Microfeatures of landform position: Open depressions
Down-slope shape: Convex, linear, concave
Across-slope shape: Linear, convex, concave
Hydric soil rating: No

TedubB—Tedrow-Urban land complex, dense substratum, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2v14w
Elevation: 570 to 670 feet
Mean annual precipitation: 28 to 38 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 135 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Tedrow, human transported surface, and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tedrow, Human Transported Surface

Setting

Landform: Wave-worked till plains, water-lain moraines, deltas
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Sandy human-transported material over sandy glaciolacustrine deposits over clayey lodgment till

Typical profile

^Au - 0 to 9 inches: loamy sand
^Cu - 9 to 12 inches: sand
Bwb - 12 to 35 inches: sand
C - 35 to 67 inches: sand
2Cd - 67 to 80 inches: clay

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: 51 to 72 inches to densic material

Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 10 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 28 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.5 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Ecological site: F099XY003MI - Warm Moist Sandy Depression
Hydric soil rating: No

Description of Urban Land

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Avoca, human transported surface

Percent of map unit: 8 percent
Landform: Deltas, wave-worked till plains, water-lain moraines
Down-slope shape: Linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Brems, human transported surface

Percent of map unit: 4 percent
Landform: Water-lain moraines, deltas, wave-worked till plains
Microfeatures of landform position: Rises
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Belleville, human transported surface

Percent of map unit: 2 percent
Landform: Water-lain moraines, deltas, wave-worked till plains
Microfeatures of landform position: Open depressions
Down-slope shape: Linear, concave
Across-slope shape: Convex, linear

Hydric soil rating: No

Riverfront

Percent of map unit: 1 percent
Landform: Wave-worked till plains, water-lain moraines, deltas
Down-slope shape: Linear
Across-slope shape: Convex, linear
Hydric soil rating: No

UrbaoB—Urban land-Fortress family complex, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2whst
Elevation: 570 to 710 feet
Mean annual precipitation: 28 to 38 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 135 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Fortress family and similar soils: 19 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Fortress Family

Setting

Landform: Deltas, nearshore zones (relict)
Down-slope shape: Linear
Across-slope shape: Convex, linear
Parent material: Sandy human-transported material

Typical profile

^Au - 0 to 9 inches: loamy sand

^Cu - 9 to 80 inches: gravelly-artifactual sand

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 36 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.5 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Ecological site: F099XY003MI - Warm Moist Sandy Depression
Hydric soil rating: No

Minor Components

Riverfront, steep

Percent of map unit: 1 percent
Landform: Lakebeds (relict), deltas, drainageways
Down-slope shape: Linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

UrbapB—Urban land-Fortress family complex, dense substratum, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 2whsw
Elevation: 570 to 670 feet
Mean annual precipitation: 28 to 38 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 135 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Fortress family, dense substratum, and similar soils: 19 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Fortress Family, Dense Substratum

Setting

Landform: Water-lain moraines, wave-worked till plains
Down-slope shape: Linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy human-transported material over clayey lodgment till

Typical profile

^Au - 0 to 9 inches: loamy sand
^Cu - 9 to 68 inches: gravelly-artifactual sand
2Cd - 68 to 80 inches: clay

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: 54 to 78 inches to densic material
Drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 30 to 54 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 28 percent
Gypsum, maximum content: 1 percent
Maximum salinity: Nonsaline (0.1 to 1.5 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A
Ecological site: F099XY003MI - Warm Moist Sandy Depression
Hydric soil rating: No

Minor Components

Riverfront, dense substratum, steep

Percent of map unit: 1 percent
Landform: Deltas, water-lain moraines, wave-worked till plains
Down-slope shape: Linear
Across-slope shape: Convex, linear

Hydric soil rating: No

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APPENDIX F

USFWS Response and Documentation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
Phone: (517) 351-2555 Fax: (517) 351-1443
http://www.fws.gov/midwest/EastLansing/

In Reply Refer To: March 30, 2022
Project Code: 2022-0025818
Project Name: City of Pleasant Ridge - 2022 DWSRF Project Plan

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Official Species List
The attached species list identifies any Federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Under 50 CFR 402.12(e) (the regulations that implement section 7 of the Endangered Species Act), the accuracy of this species list should be verified after 90 days. You may verify the list by visiting the IPaC website (https://ipac.ecosphere.fws.gov/) at regular intervals during project planning and implementation. To update an Official Species List in IPaC: from the My Projects page, find the project, expand the row, and click Project Home. In the What's Next box on the Project Home page, there is a Request Updated List button to update your species list. Be sure to select an "official" species list for all projects.

Consultation requirements and next steps
Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize Federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-Federal representative) must consult with the Fish and Wildlife Service if they determine their project may affect listed species or critical habitat.

There are two approaches to evaluating the effects of a project on listed species.

Approach 1. Use the All-species Michigan determination key in IPaC. This tool can assist you in

making determinations for listed species for some projects. In many cases, the determination key will provide an automated concurrence that completes all or significant parts of the consultation process. Therefore, we strongly recommend screening your project with the **All-Species Michigan Determination Key (Dkey)**. For additional information on using IPaC and available Determination Keys, visit https://www.fws.gov/midwest/EastLansing/te/pdf/MIFO_IPAC_instructions_v1_Jan2021.pdf. Please carefully review your Dkey output letter to determine whether additional steps are needed to complete the consultation process.

Approach 2. Evaluate the effects to listed species on your own without utilizing a determination key. Once you obtain your official species list, you are not required to continue in IPaC, although in most cases using a determination key should expedite your review. If the project is a Federal action, you should review our section 7 step-by-step instructions before making your determinations: http://www.fws.gov/midwest/endangered/section7/s7process/index.html. If you evaluate the details of your project and conclude "no effect," document your findings, and your listed species review is complete; you do not need our concurrence on "no effect" determinations. If you cannot conclude "no effect," you should coordinate/consult with the Michigan Ecological Services Field Office. The preferred method for submitting your project description and effects determination (if concurrence is needed) is electronically to EastLansing@fws.gov. Please include a copy of this official species list with your request.

For all **wind energy projects** and **projects that include installing communications towers that use guy wires**, please contact this field office directly for assistance, even if no Federally listed plants, animals or critical habitat are present within your proposed project area or may be affected by your proposed project.

Migratory Birds
Please see the "Migratory Birds" section below for important information regarding incorporating migratory birds into your project planning. Our Migratory Bird Program has developed recommendations, best practices, and other tools to help project proponents voluntarily reduce impacts to birds and their habitats. The Bald and Golden Eagle Protection Act prohibits the take and disturbance of eagles without a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at https://www.fws.gov/midwest/eagle/permits/index.html to help you avoid impacting eagles or determine if a permit may be necessary.

Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/administrative-orders/executive-orders.php.

We appreciate your consideration of threatened and endangered species during your project planning. Please include a copy of this letter with any request for consultation or correspondence

about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
(517) 351-2555

Project Summary

Project Code: 2022-0025818
Event Code: None
Project Name: City of Pleasant Ridge - 2022 DWSRF Project Plan
Project Type: Water Supply Pipeline - New Constr - Below Ground
Project Description: This project is a multi-year project and is anticipated to start after July 1, 2023. The project will consist of replacing approximately 39,000 linear feet of 100-year-old 6" cast iron water main, and an estimated 680 lead service lines (public and private portion) on 20 streets in Pleasant Ridge.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.47160615,-83.14445390339552,14z

Counties: Oakland County, Michigan

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat *Myotis sodalis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ipac.ecosphere.fws.gov/project/QETONCFUCBDHVDU6BFBHFSNME4/documents/generated/5663.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ipac.ecosphere.fws.gov/project/QETONCFUCBDHVDU6BFBHFSNME4/documents/generated/5664.pdf	Threatened

Reptiles

NAME	STATUS
Eastern Massasauga (=rattlesnake) *Sistrurus catenatus*	Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- For all Projects: Project is within EMR Range

Species profile: https://ecos.fws.gov/ecp/species/2202

General project design guidelines:
https://ipac.ecosphere.fws.gov/project/QETONCFUCBDHVDU6BFBHFSNME4/documents/generated/5280.pdf

Clams

NAME	STATUS
Rayed Bean *Villosa fabalis*	Endangered

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/5862

Snuffbox Mussel *Epioblasma triquetra*	Endangered

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/4135

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/9743

Poweshiek Skipperling *Oarisma poweshiek*	Endangered

There is **final** critical habitat for this species. The location of the critical habitat is not available.

Species profile: https://ecos.fws.gov/ecp/species/9161

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 22 to Jul 20
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

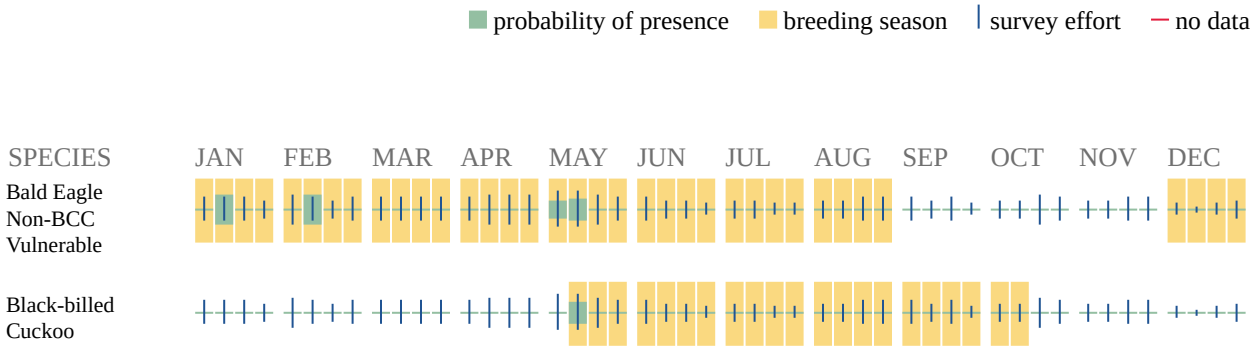
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding

in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);

2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities,

should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

IPaC User Contact Information

Agency: Pleasant Ridge city
Name: Brett McDonald
Address: 51301 Schoenherr Road
City: Shelby
State: MI
Zip: 48315
Email bmcdonald@aewinc.com
Phone: 5868396528

APPENDIX G

Proposed Water Main Replacement Summary

N

City of Huntington Woods

City of Royal Oak

Watermain constructed in 1998. LSL's Replaced in 2021

Watermain constructed in 1985

Watermain constructed in 2000. LSL's replaced in 2021

Watermain constructed in 1985

Watermain + LSL's to be replaced in 2022

I - 696

E. 10 Mile Rd.

W. 10 Mile Rd.

Millington Rd.

S. Main St.

Kensington Blvd.

Eprize Dr.

Canadian National Rail Road

Woodside Park Blvd.

Poplar Park Blvd.

Devonshire Rd.

Kenberton Dr.

Water Main Constructed in 2004. LSL's Replaced in 2021

Woodward Ave.

Wellesley Dr.

Elm Park Ave.

Elm Park Blvd.

Indiana Ave.

Amherst Rd.

Maplefield Rd.

Oakdale Blvd.

Ridge Rd.

Maywood Ave.

Norwich Rd.

Oakland Park Blvd.

Sylvan Ave.

Hanover Rd.

Fairwood Blvd.

Oxford Blvd.

Bermuda Ave.

Woodward Heights Blvd.

Cambridge Blvd.

Cambridge Blvd.

City of Oak Park

City of Ferndale

City of Ferndale

Legend

- Valve Boxes
- Hydrants
- Gatewells
- Water Main

- Year 1 - $5.42M
- Year 2 - $5.53M
- Year 3 - $5.54M
- Year 4 - $5.64M

REFERENCE SHEET NUMBER
BASEMAP

CAUTION

THIS MAP IS INTENDED FOR REFERENCE PURPOSES ONLY

ANDERSON, ECKSTEIN AND WESTRICK, INC. AND THE CITY OF PLEASANT RIDGE DO NOT GUARANTEE THE ACCURACY OF THIS INFORMATION AND ARE NOT LIABLE FOR ANY CLAIMS, LOSSES, SUITS, DEMANDS AND JUDGEMENTS ARISING FROM THE USE OF THIS INFORMATION

City of Pleasant Ridge

2022 DWSRF DRAFT PROJECT PLAN
4 YEAR PROJECT IMPLEMENTATION

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS SURVEYORS ARCHITECTS
51301 SCHOENHERR RD. SHELBY TOWNSHIP, MI 48315
p(586)726-1234
www.aewinc.com

PLOT DATE:	MAY 4, 2022	DRAWING DATE:	MAY 4, 2022
PLOT SCALE:	NTS	DRAWING SCALE:	NTS
PLOT CONFIG:	11 x 17	PROJECT NO:	0175-0128
ATTACH XREF:	NONE	DRAWING FILE:	OverallWaterMain.mxd
		DRAWN BY:	JSS
		CHK'D BY:	BM

APPENDIX H

Preliminary Cost Estimates

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO.: 0175-0128

PROJECT NAME: 2022 Draft DWSRF Project Plan

OWNER: City of Pleasant Ridge

PREPARED BY: Brett McDonald, PE

DATE: 05/04/2022

CHECKED BY: Michael D. Smith, PE

DATE: 05/04/2022

DWSRF DRAFT PROJECT PLAN - 4 YEAR PROJECT IMPLEMENTATION

Year 1		Amount
1.	Cambridge Blvd. - Maplefield to Ridge	$948,581.00
2.	Cambridge Blvd. - Oxford to Woodward	$1,216,929.00
3.	Woodward Heights Blvd. - Woodward to East Side	$1,235,151.00
4.	SB Woodward - ELA to OPB	$428,280.00
5.	Indiana - N.C.L. to S.C.L. & Tie-in Across Fairwood	$939,000.00
6.	Poplar Park Blvd. - Ridge to Woodward	$648,295.00
	Year 1 Subtotal	$5,416,236.00
	Year 1 Inflation Factor (From 2022 Dollars)	1.04
	Year 1 Total	$5,649,675.77

Year 2		Amount
7.	Fairwood Blvd. - Woodward to End	$1,274,293.00
8.	Ridge Road - I696 to South Side	$1,147,898.50
9.	Wellesley Drive - Woodward to End	$1,565,355.00
10.	Oakdale Blvd. - W 10 mile to Cambridge	$1,543,620.00
	Year 2 Subtotal	$5,531,166.50
	Year 2 Inflation Factor (From 2022 Dollars)	1.09
	Year 2 Total	$6,007,953.05

Year 3		Amount
11.	Norwich Road - Oakdale to Ridge	$738,250.50
12.	Hanover Road - Oakdale to Ridge	$773,842.00
13.	Amherst Road - Woodward to End	$1,366,720.00
14.	Sylvan Ave. - Woodward to End	$1,335,880.50
15.	Kenberton Drive - Oakdale to Ridge	$632,753.00
16.	Elm Park Ave. - Oakdale to Ridge	$689,837.00
	Year 3 Subtotal	$5,537,283.00
	Year 3 Inflation Factor (From 2022 Dollars)	1.13
	Year 3 Total	$6,253,253.69

Year 4		Amount
17.	Devonshire Road - Woodward to End	$1,471,667.00
18.	Maywood Ave. - Woodward to End	$1,370,440.00
19.	Woodside park Blvd. - Oakdale to Ridge	$753,800.00
20.	Oakland Park Blvd. - Ridge to Woodward	$874,345.00
21.	Oxford Blvd. - Ridge to Woodward	$1,171,660.50
	Year 4 Subtotal	$5,641,912.50
	Year 4 Inflation Factor (From 2022 Dollars)	1.17
	Year 4 Total	$6,614,578.22

	Grand Total	$24,525,000.00

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Woodside park Blvd. - Oakdale to Ridge

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 8 inch	1350	FT	$ 10.00	$ 13,500.00
_ Fire Hydrant, Assembely	2	Each	$ 6,000.00	$ 12,000.00
Fire Hydrant, Rem	2	Each	$ 675.00	$ 1,350.00
Gate Valve and Well, 8 inch	2	Each	$ 6,200.00	$ 12,400.00
_Gate Valve and Well, Rem	2	Each	$ 1,000.00	$ 2,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1350	FT	$ 130.00	$ 175,500.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service, Short (WM to Valve Box)	16	Each	$ 900.00	$ 14,400.00
Water Service, Long (WM to Valve Box)	16	Each	$ 1,900.00	$ 30,400.00
_ Water Service, Special	32	Each	$ 4,500.00	$ 144,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	199	Syd	$ 13.00	$ 2,587.00
Pavt Repr, Nonreinf Conc, 8 inch	199	Syd	$ 90.00	$ 17,910.00
Curb and Gutter, Rem	70	FT	$ 12.00	$ 840.00
_ Curb and Gutter, Conc, Det F4, Modified	70	FT	$ 30.00	$ 2,100.00
Sidewalk, Rem	265	Syd	$ 10.00	$ 2,650.00
Sidewalk, Conc, 4 inch	2300	Sft	$ 6.00	$ 13,800.00
Sidewalk Ramp, Conc, 8 inch	80	Sft	$ 10.50	$ 840.00
Aggregate Base, 6 inch	384	Syd	$ 11.00	$ 4,224.00
_ Driveway, Rem	169	Syd	$ 11.00	$ 1,859.00
Driveway, Nonreinf Conc, 8 inch	169	Syd	$ 60.00	$ 10,140.00
Soil Erosion				
_ Erosion Control, Inlet Filter	12	Each	$ 175.00	$ 2,100.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 41,760.00	$ 41,760.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	3	Each	$ 1,200.00	$ 3,600.00
Tree, Rem, 6 inch to 18 inch	10	Each	$ 750.00	$ 7,500.00
_ Tree, Rem, Less than 6 inch	7	Each	$ 500.00	$ 3,500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	200	TON	$ 50.00	$ 10,000.00
			TOTAL COST	$ 565,060.00

CONSTRUCTION COST	$ 565,060.00
Design Engineering (6.9%)	$ 38,990.00
Construction Engineering (15%)	$ 84,760.00
Material Testing (1.5%)	$ 8,480.00
Contingencies (10%)	$ 56,510.00
TOTAL COST	$ 753,800.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Kenberton Drive - Oakdale to Ridge

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1360	FT	$ 8.00	$ 10,880.00
_ Fire Hydrant, Assembely	2	Each	$ 6,000.00	$ 12,000.00
Fire Hydrant, Rem	2	Each	$ 675.00	$ 1,350.00
Gate Valve and Well, 8 inch	2	Each	$ 6,200.00	$ 12,400.00
_Gate Valve and Well, Rem	2	Each	$ 1,000.00	$ 2,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1360	FT	$ 130.00	$ 176,800.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	11	Each	$ 900.00	$ 9,900.00
Water Service, Long (WM to Valve Box)	11	Each	$ 1,900.00	$ 20,900.00
_ Water Service, Special	22	Each	$ 4,500.00	$ 99,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	153	Syd	$ 13.00	$ 1,989.00
Pavt Repr, Nonreinf Conc, 8 inch	153	Syd	$ 90.00	$ 13,770.00
Curb and Gutter, Rem	88	FT	$ 12.00	$ 1,056.00
_ Curb and Gutter, Conc, Det F4, Modified	88	FT	$ 30.00	$ 2,640.00
Sidewalk, Rem	215	Syd	$ 10.00	$ 2,150.00
Sidewalk, Conc, 4 inch	1859	Sft	$ 6.00	$ 11,154.00
Sidewalk Ramp, Conc, 8 inch	70	Sft	$ 10.50	$ 735.00
Aggregate Base, 6 inch	232	Syd	$ 11.00	$ 2,552.00
_ Driveway, Rem	59	Syd	$ 11.00	$ 649.00
Driveway, Nonreinf Conc, 8 inch	59	Syd	$ 60.00	$ 3,540.00
Soil Erosion				
_ Erosion Control, Inlet Filter	13	Each	$ 175.00	$ 2,275.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 35,083.00	$ 35,083.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	1	Each	$ 1,200.00	$ 1,200.00
Tree, Rem, 6 inch to 18 inch	6	Each	$ 750.00	$ 4,500.00
_ Tree, Rem, Less than 6 inch	2	Each	$ 500.00	$ 1,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	200	TON	$ 50.00	$ 10,000.00
			TOTAL COST	$ 473,623.00

CONSTRUCTION COST	$ 473,623.00
Design Engineering (7.1%)	$ 33,630.00
Construction Engineering (15%)	$ 71,040.00
Material Testing (1.5%)	$ 7,100.00
Contingencies (10%)	$ 47,360.00
TOTAL COST	$ 632,753.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Elm Park Ave. - Oakdale to Ridge

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1350	FT	$ 8.00	$ 10,800.00
_ Fire Hydrant, Assembely	3	Each	$ 6,000.00	$ 18,000.00
Fire Hydrant, Rem	3	Each	$ 675.00	$ 2,025.00
Gate Valve and Well, 8 inch	2	Each	$ 6,200.00	$ 12,400.00
_Gate Valve and Well, Rem	2	Each	$ 1,000.00	$ 2,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1350	FT	$ 130.00	$ 175,500.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	13	Each	$ 900.00	$ 11,700.00
Water Service, Long (WM to Valve Box)	13	Each	$ 1,900.00	$ 24,700.00
_ Water Service, Special	26	Each	$ 4,500.00	$ 117,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	171	Syd	$ 13.00	$ 2,223.00
Pavt Repr, Nonreinf Conc, 8 inch	171	Syd	$ 90.00	$ 15,390.00
Curb and Gutter, Rem	196	FT	$ 12.00	$ 2,352.00
_ Curb and Gutter, Conc, Det F4, Modified	196	FT	$ 30.00	$ 5,880.00
Sidewalk, Rem	233	Syd	$ 10.00	$ 2,330.00
Sidewalk, Conc, 4 inch	2000	Sft	$ 6.00	$ 12,000.00
Sidewalk Ramp, Conc, 8 inch	90	Sft	$ 10.50	$ 945.00
Aggregate Base, 6 inch	315	Syd	$ 11.00	$ 3,465.00
_ Driveway, Rem	100	Syd	$ 11.00	$ 1,100.00
Driveway, Nonreinf Conc, 8 inch	100	Syd	$ 60.00	$ 6,000.00
Soil Erosion				
_ Erosion Control, Inlet Filter	8	Each	$ 175.00	$ 1,400.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 38,277.00	$ 38,277.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	2	Each	$ 1,200.00	$ 2,400.00
Tree, Rem, 6 inch to 18 inch	5	Each	$ 750.00	$ 3,750.00
_ Tree, Rem, Less than 6 inch	2	Each	$ 500.00	$ 1,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	200	TON	$ 50.00	$ 10,000.00
			TOTAL COST	$ 516,737.00
CONSTRUCTION COST				$ 516,737.00
Design Engineering (7.0%)				$ 36,170.00
Construction Engineering (15%)				$ 77,510.00
Material Testing (1.5%)				$ 7,750.00
Contingencies (10%)				$ 51,670.00
TOTAL COST				$ 689,837.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
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PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Norwich Road - Oakdale to Ridge

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1360	FT	$ 8.00	$ 10,880.00
_ Fire Hydrant, Assembely	2	Each	$ 6,000.00	$ 12,000.00
Fire Hydrant, Rem	2	Each	$ 675.00	$ 1,350.00
Gate Valve and Well, 8 inch	3	Each	$ 6,200.00	$ 18,600.00
_Gate Valve and Well, Rem	3	Each	$ 1,000.00	$ 3,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1360	FT	$ 130.00	$ 176,800.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	14	Each	$ 900.00	$ 12,600.00
Water Service, Long (WM to Valve Box)	17	Each	$ 1,900.00	$ 32,300.00
_ Water Service, Special	31	Each	$ 4,500.00	$ 139,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	207	Syd	$ 13.00	$ 2,691.00
Pavt Repr, Nonreinf Conc, 8 inch	207	Syd	$ 90.00	$ 18,630.00
Curb and Gutter, Rem	86	FT	$ 12.00	$ 1,032.00
_ Curb and Gutter, Conc, Det F4, Modified	86	FT	$ 30.00	$ 2,580.00
Sidewalk, Rem	252	Syd	$ 10.00	$ 2,520.00
Sidewalk, Conc, 4 inch	2240	Sft	$ 6.00	$ 13,440.00
Sidewalk Ramp, Conc, 8 inch	27	Sft	$ 10.50	$ 283.50
Aggregate Base, 6 inch	329	Syd	$ 11.00	$ 3,619.00
_ Driveway, Rem	102	Syd	$ 11.00	$ 1,122.00
Driveway, Nonreinf Conc, 8 inch	102	Syd	$ 60.00	$ 6,120.00
Soil Erosion				
_ Erosion Control, Inlet Filter	8	Each	$ 175.00	$ 1,400.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 40,993.00	$ 40,993.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	3	Each	$ 1,200.00	$ 3,600.00
Tree, Rem, 6 inch to 18 inch	5	Each	$ 750.00	$ 3,750.00
_ Tree, Rem, Less than 6 inch	1	Each	$ 500.00	$ 500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	200	TON	$ 50.00	$ 10,000.00
			TOTAL COST	$ 553,410.50
CONSTRUCTION COST				$ 553,410.50
Design Engineering (6.9%)				$ 38,190.00
Construction Engineering (15%)				$ 83,010.00
Material Testing (1.5%)				$ 8,300.00
Contingencies (10%)				$ 55,340.00
TOTAL COST				$ 738,250.50

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
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Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Hanover Road - Oakdale to Ridge

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1350	FT	$ 8.00	$ 10,800.00
_ Fire Hydrant, Assembely	2	Each	$ 6,000.00	$ 12,000.00
Fire Hydrant, Rem	2	Each	$ 675.00	$ 1,350.00
Gate Valve and Well, 8 inch	3	Each	$ 6,200.00	$ 18,600.00
_Gate Valve and Well, Rem	3	Each	$ 1,000.00	$ 3,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1350	FT	$ 130.00	$ 175,500.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	15	Each	$ 900.00	$ 13,500.00
Water Service, Long (WM to Valve Box)	20	Each	$ 1,900.00	$ 38,000.00
_ Water Service, Special	35	Each	$ 4,500.00	$ 157,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	225	Syd	$ 13.00	$ 2,925.00
Pavt Repr, Nonreinf Conc, 8 inch	225	Syd	$ 90.00	$ 20,250.00
Curb and Gutter, Rem	40	FT	$ 12.00	$ 480.00
_ Curb and Gutter, Conc, Det F4, Modified	40	FT	$ 30.00	$ 1,200.00
Sidewalk, Rem	281	Syd	$ 10.00	$ 2,810.00
Sidewalk, Conc, 4 inch	2435	Sft	$ 6.00	$ 14,610.00
Sidewalk Ramp, Conc, 8 inch	90	Sft	$ 10.50	$ 945.00
Aggregate Base, 6 inch	327	Syd	$ 11.00	$ 3,597.00
_ Driveway, Rem	93	Syd	$ 11.00	$ 1,023.00
Driveway, Nonreinf Conc, 8 inch	93	Syd	$ 60.00	$ 5,580.00
Soil Erosion				
_ Erosion Control, Inlet Filter	8	Each	$ 175.00	$ 1,400.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 43,002.00	$ 43,002.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	3	Each	$ 1,200.00	$ 3,600.00
Tree, Rem, 6 inch to 18 inch	5	Each	$ 750.00	$ 3,750.00
_ Tree, Rem, Less than 6 inch	2	Each	$ 500.00	$ 1,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	200	TON	$ 50.00	$ 10,000.00
			TOTAL COST	$ 580,522.00
CONSTRUCTION COST				$ 580,522.00
Design Engineering (6.8%)				$ 39,480.00
Construction Engineering (15%)				$ 87,080.00
Material Testing (1.5%)				$ 8,710.00
Contingencies (10%)				$ 58,050.00
TOTAL COST				$ 773,842.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Cambridge Blvd. - Maplefield to Ridge

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1700	FT	$ 8.00	$ 13,600.00
_ Fire Hydrant, Assembely	2	Each	$ 6,000.00	$ 12,000.00
Fire Hydrant, Rem	2	Each	$ 675.00	$ 1,350.00
Gate Valve and Well, 8 inch	4	Each	$ 6,200.00	$ 24,800.00
_Gate Valve and Well, Rem	4	Each	$ 1,000.00	$ 4,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1700	FT	$ 130.00	$ 221,000.00
_ Water Main Connection, 8 inch	1	Each	$ 4,500.00	$ 4,500.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	18	Each	$ 900.00	$ 16,200.00
Water Service, Long (WM to Valve Box)	23	Each	$ 1,900.00	$ 43,700.00
_ Water Service, Special	41	Each	$ 4,500.00	$ 184,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	266	Syd	$ 13.00	$ 3,458.00
Pavt Repr, Nonreinf Conc, 8 inch	266	Syd	$ 90.00	$ 23,940.00
Curb and Gutter, Rem	286	FT	$ 12.00	$ 3,432.00
_ Curb and Gutter, Conc, Det F4, Modified	286	FT	$ 30.00	$ 8,580.00
Sidewalk, Rem	336	Syd	$ 10.00	$ 3,360.00
Sidewalk, Conc, 4 inch	2756	Sft	$ 6.00	$ 16,536.00
Sidewalk Ramp, Conc, 8 inch	260	Sft	$ 10.50	$ 2,730.00
Aggregate Base, 6 inch	437	Syd	$ 11.00	$ 4,807.00
_ Driveway, Rem	107	Syd	$ 11.00	$ 1,177.00
Driveway, Nonreinf Conc, 8 inch	107	Syd	$ 60.00	$ 6,420.00
Soil Erosion				
_ Erosion Control, Inlet Filter	12	Each	$ 175.00	$ 2,100.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 52,791.00	$ 52,791.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	3	Each	$ 1,200.00	$ 3,600.00
Tree, Rem, 6 inch to 18 inch	8	Each	$ 750.00	$ 6,000.00
_ Tree, Rem, Less than 6 inch	6	Each	$ 500.00	$ 3,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	300	TON	$ 50.00	$ 15,000.00
			TOTAL COST	$ 712,681.00
CONSTRUCTION COST				$ 712,681.00
Design Engineering (6.6%)				$ 47,040.00
Construction Engineering (15%)				$ 106,900.00
Material Testing (1.5%)				$ 10,690.00
Contingencies (10%)				$ 71,270.00
TOTAL COST				$ 948,581.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Oakdale Blvd. - W 10 mile to Cambridge

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	2160	FT	$ 8.00	$ 17,280.00
_ Fire Hydrant, Assembely	5	Each	$ 6,000.00	$ 30,000.00
Fire Hydrant, Rem	5	Each	$ 675.00	$ 3,375.00
Gate Valve and Well, 8 inch	6	Each	$ 6,200.00	$ 37,200.00
_Gate Valve and Well, Rem	6	Each	$ 1,000.00	$ 6,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2160	FT	$ 130.00	$ 280,800.00
_ Water Main Connection, 6 inch	6	Each	$ 4,000.00	$ 24,000.00
_ Water Main Connection, 8 inch	1	Each	$ 4,500.00	$ 4,500.00
Water Service (WM to Valve Box)	35	Each	$ 900.00	$ 31,500.00
Water Service, Long (WM to Valve Box)	39	Each	$ 1,900.00	$ 74,100.00
_ Water Service, Special	74	Each	$ 4,500.00	$ 333,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	507	Syd	$ 13.00	$ 6,591.00
Pavt Repr, Nonreinf Conc, 8 inch	507	Syd	$ 90.00	$ 45,630.00
Curb and Gutter, Rem	1000	FT	$ 12.00	$ 12,000.00
_ Curb and Gutter, Conc, Det F4, Modified	1000	FT	$ 30.00	$ 30,000.00
Sidewalk, Rem	674	Syd	$ 10.00	$ 6,740.00
Sidewalk, Conc, 4 inch	5100	Sft	$ 6.00	$ 30,600.00
Sidewalk Ramp, Conc, 8 inch	966	Sft	$ 10.50	$ 10,143.00
Aggregate Base, 6 inch	880	Syd	$ 11.00	$ 9,680.00
_ Driveway, Rem	150	Syd	$ 11.00	$ 1,650.00
Driveway, Nonreinf Conc, 8 inch	150	Syd	$ 60.00	$ 9,000.00
Soil Erosion				
_ Erosion Control, Inlet Filter	16	Each	$ 175.00	$ 2,800.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 86,231.00	$ 86,231.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	6	Each	$ 1,200.00	$ 7,200.00
Tree, Rem, 6 inch to 18 inch	18	Each	$ 750.00	$ 13,500.00
_ Tree, Rem, Less than 6 inch	12	Each	$ 500.00	$ 6,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	400	TON	$ 50.00	$ 20,000.00
			TOTAL COST	$ 1,164,120.00

CONSTRUCTION COST	$ 1,164,120.00
Design Engineering (6.1%)	$ 71,010.00
Construction Engineering (15%)	$ 174,620.00
Material Testing (1.5%)	$ 17,460.00
Contingencies (10%)	$ 116,410.00
TOTAL COST	$ 1,543,620.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

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51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Ridge Road - I696 to South Side

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 10 inch	2420	FT	$ 11.00	$ 26,620.00
_ Fire Hydrant, Assembely	4	Each	$ 6,000.00	$ 24,000.00
Fire Hydrant, Rem	4	Each	$ 675.00	$ 2,700.00
Gate Valve and Well, 8 inch	4	Each	$ 6,200.00	$ 24,800.00
_Gate Valve and Well, Rem	4	Each	$ 1,000.00	$ 4,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2420	FT	$ 130.00	$ 314,600.00
_ Water Main Connection, 6 inch	5	Each	$ 4,000.00	$ 20,000.00
_ Water Main Connection, 8 inch	5	Each	$ 4,500.00	$ 22,500.00
_ Water Main Connection, 10 inch	3	Each	$ 5,500.00	$ 16,500.00
Water Service (WM to Valve Box)	23	Each	$ 900.00	$ 20,700.00
Water Service, Long (WM to Valve Box)	9	Each	$ 1,900.00	$ 17,100.00
_ Water Service, Special	32	Each	$ 4,500.00	$ 144,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	365	Syd	$ 13.00	$ 4,745.00
Pavt Repr, Nonreinf Conc, 8 inch	365	Syd	$ 90.00	$ 32,850.00
Curb and Gutter, Rem	220	FT	$ 12.00	$ 2,640.00
_ Curb and Gutter, Conc, Det F4, Modified	220	FT	$ 30.00	$ 6,600.00
Sidewalk, Rem	408	Syd	$ 10.00	$ 4,080.00
Sidewalk, Conc, 4 inch	2352	Sft	$ 6.00	$ 14,112.00
Sidewalk Ramp, Conc, 8 inch	1315	Sft	$ 10.50	$ 13,807.50
Aggregate Base, 6 inch	509	Syd	$ 11.00	$ 5,599.00
_ Driveway, Rem	95	Syd	$ 11.00	$ 1,045.00
Driveway, Nonreinf Conc, 8 inch	95	Syd	$ 60.00	$ 5,700.00
Soil Erosion				
_ Erosion Control, Inlet Filter	24	Each	$ 175.00	$ 4,200.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 63,980.00	$ 63,980.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	5	Each	$ 1,200.00	$ 6,000.00
Tree, Rem, 6 inch to 18 inch	15	Each	$ 750.00	$ 11,250.00
_ Tree, Rem, Less than 6 inch	10	Each	$ 500.00	$ 5,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	400	TON	$ 50.00	$ 20,000.00
			TOTAL COST	$ 863,728.50

CONSTRUCTION COST	$ 863,728.50
Design Engineering (6.4%)	$ 55,280.00
Construction Engineering (15%)	$ 129,560.00
Material Testing (1.5%)	$ 12,960.00
Contingencies (10%)	$ 86,370.00
TOTAL COST	$ 1,147,898.50

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Poplar Park Blvd. - Ridge to Woodward

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1140	FT	$ 8.00	$ 9,120.00
_ Fire Hydrant, Assembely	2	Each	$ 6,000.00	$ 12,000.00
Fire Hydrant, Rem	2	Each	$ 675.00	$ 1,350.00
Gate Valve and Well, 8 inch	2	Each	$ 6,200.00	$ 12,400.00
_Gate Valve and Well, Rem	2	Each	$ 1,000.00	$ 2,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1140	FT	$ 130.00	$ 148,200.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
_ Water Main Connection, 48 inch	1	Each	$ 30,000.00	$ 30,000.00
Water Service (WM to Valve Box)	10	Each	$ 900.00	$ 9,000.00
Water Service, Long (WM to Valve Box)	11	Each	$ 1,900.00	$ 20,900.00
_ Water Service, Special	21	Each	$ 4,500.00	$ 94,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	130	Syd	$ 13.00	$ 1,690.00
Pavt Repr, Nonreinf Conc, 8 inch	130	Syd	$ 90.00	$ 11,700.00
Curb and Gutter, Rem	142	FT	$ 12.00	$ 1,704.00
_ Curb and Gutter, Conc, Det F4, Modified	142	FT	$ 30.00	$ 4,260.00
Sidewalk, Rem	188	Syd	$ 10.00	$ 1,880.00
Sidewalk, Conc, 4 inch	1505	Sft	$ 6.00	$ 9,030.00
Sidewalk Ramp, Conc, 8 inch	182	Sft	$ 10.50	$ 1,911.00
Aggregate Base, 6 inch	312	Syd	$ 11.00	$ 3,432.00
_ Driveway, Rem	150	Syd	$ 11.00	$ 1,650.00
Driveway, Nonreinf Conc, 8 inch	150	Syd	$ 60.00	$ 9,000.00
Soil Erosion				
_ Erosion Control, Inlet Filter	12	Each	$ 175.00	$ 2,100.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 35,998.00	$ 35,998.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	4	Each	$ 1,200.00	$ 4,800.00
Tree, Rem, 6 inch to 18 inch	13	Each	$ 750.00	$ 9,750.00
_ Tree, Rem, Less than 6 inch	5	Each	$ 500.00	$ 2,500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	300	TON	$ 50.00	$ 15,000.00
			TOTAL COST	$ 485,975.00

CONSTRUCTION COST	$ 485,975.00
Design Engineering (6.9%)	$ 33,530.00
Construction Engineering (15%)	$ 72,900.00
Material Testing (1.5%)	$ 7,290.00
Contingencies (10%)	$ 48,600.00
TOTAL COST	$ 648,295.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Oakland Park Blvd. - Ridge to Woodward

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 8 inch	1680	FT	$ 10.00	$ 16,800.00
_ Fire Hydrant, Assembely	3	Each	$ 6,000.00	$ 18,000.00
Fire Hydrant, Rem	3	Each	$ 675.00	$ 2,025.00
Gate Valve and Well, 8 inch	2	Each	$ 6,200.00	$ 12,400.00
_Gate Valve and Well, Rem	2	Each	$ 1,000.00	$ 2,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1680	FT	$ 130.00	$ 218,400.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
_ Water Main Connection, 48 inch	1	Each	$ 30,000.00	$ 30,000.00
Water Service (WM to Valve Box)	14	Each	$ 900.00	$ 12,600.00
Water Service, Long (WM to Valve Box)	17	Each	$ 1,900.00	$ 32,300.00
_ Water Service, Special	31	Each	$ 4,500.00	$ 139,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	194	Syd	$ 13.00	$ 2,522.00
Pavt Repr, Nonreinf Conc, 8 inch	194	Syd	$ 90.00	$ 17,460.00
Curb and Gutter, Rem	216	FT	$ 12.00	$ 2,592.00
_ Curb and Gutter, Conc, Det F4, Modified	216	FT	$ 30.00	$ 6,480.00
Sidewalk, Rem	234	Syd	$ 10.00	$ 2,340.00
Sidewalk, Conc, 4 inch	1916	Sft	$ 6.00	$ 11,496.00
Sidewalk Ramp, Conc, 8 inch	184	Sft	$ 10.50	$ 1,932.00
Aggregate Base, 6 inch	365	Syd	$ 11.00	$ 4,015.00
_ Driveway, Rem	123	Syd	$ 11.00	$ 1,353.00
Driveway, Nonreinf Conc, 8 inch	123	Syd	$ 60.00	$ 7,380.00
Soil Erosion				
_ Erosion Control, Inlet Filter	10	Each	$ 175.00	$ 1,750.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 48,660.00	$ 48,660.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	4	Each	$ 1,200.00	$ 4,800.00
Tree, Rem, 6 inch to 18 inch	10	Each	$ 750.00	$ 7,500.00
_ Tree, Rem, Less than 6 inch	15	Each	$ 500.00	$ 7,500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	300	TON	$ 50.00	$ 15,000.00
			TOTAL COST	$ 656,905.00

CONSTRUCTION COST	$ 656,905.00
Design Engineering (6.6%)	$ 43,360.00
Construction Engineering (15%)	$ 98,540.00
Material Testing (1.5%)	$ 9,850.00
Contingencies (10%)	$ 65,690.00
TOTAL COST	$ 874,345.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
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PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Oxford Blvd. - Ridge to Woodward

OWNER: City of Pleasant Ridge

PREPARED BY: Nicholas P. Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 10 inch	1860	FT	$ 11.00	$ 20,460.00
_ Fire Hydrant, Assembely	4	Each	$ 6,000.00	$ 24,000.00
Fire Hydrant, Rem	4	Each	$ 675.00	$ 2,700.00
Gate Valve and Well, 8 inch	5	Each	$ 6,200.00	$ 31,000.00
_Gate Valve and Well, Rem	7	Each	$ 1,000.00	$ 7,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1860	FT	$ 130.00	$ 241,800.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
_ Water Main Connection, 12 inch	1	Each	$ 7,500.00	$ 7,500.00
_ Water Main Connection, 48 inch	1	Each	$ 30,000.00	$ 30,000.00
Water Service (WM to Valve Box)	25	Each	$ 900.00	$ 22,500.00
Water Service, Long (WM to Valve Box)	23	Each	$ 1,900.00	$ 43,700.00
_ Water Service, Special	48	Each	$ 4,500.00	$ 216,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	236	Syd	$ 13.00	$ 3,068.00
Pavt Repr, Nonreinf Conc, 8 inch	236	Syd	$ 90.00	$ 21,240.00
Curb and Gutter, Rem	280	FT	$ 12.00	$ 3,360.00
_ Curb and Gutter, Conc, Det F4, Modified	280	FT	$ 30.00	$ 8,400.00
Sidewalk, Rem	429	Syd	$ 10.00	$ 4,290.00
Sidewalk, Conc, 4 inch	3484	Sft	$ 6.00	$ 20,904.00
Sidewalk Ramp, Conc, 8 inch	377	Sft	$ 10.50	$ 3,958.50
Aggregate Base, 6 inch	602	Syd	$ 11.00	$ 6,622.00
_ Driveway, Rem	303	Syd	$ 11.00	$ 3,333.00
Driveway, Nonreinf Conc, 8 inch	303	Syd	$ 60.00	$ 18,180.00
Soil Erosion				
_ Erosion Control, Inlet Filter	6	Each	$ 175.00	$ 1,050.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 65,305.00	$ 65,305.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	7	Each	$ 1,200.00	$ 8,400.00
Tree, Rem, 6 inch to 18 inch	13	Each	$ 750.00	$ 9,750.00
_ Tree, Rem, Less than 6 inch	4	Each	$ 500.00	$ 2,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 881,620.50

CONSTRUCTION COST	$ 881,620.50
Design Engineering (6.4%)	$ 56,420.00
Construction Engineering (15%)	$ 132,240.00
Material Testing (1.5%)	$ 13,220.00
Contingencies (10%)	$ 88,160.00
TOTAL COST	$ 1,171,660.50

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
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PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Cambridge Blvd. - Oxford to Woodward

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	2200	FT	$ 8.00	$ 17,600.00
_ Fire Hydrant, Assembely	5	Each	$ 6,000.00	$ 30,000.00
Fire Hydrant, Rem	5	Each	$ 675.00	$ 3,375.00
Gate Valve and Well, 8 inch	3	Each	$ 6,200.00	$ 18,600.00
_Gate Valve and Well, Rem	3	Each	$ 1,000.00	$ 3,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2200	FT	$ 130.00	$ 286,000.00
_ Water Main Connection, 8 inch	1	Each	$ 4,500.00	$ 4,500.00
_ Water Main Connection, 10 inch	2	Each	$ 5,500.00	$ 11,000.00
Water Service (WM to Valve Box)	27	Each	$ 900.00	$ 24,300.00
Water Service, Long (WM to Valve Box)	29	Each	$ 1,900.00	$ 55,100.00
_ Water Service, Special	56	Each	$ 4,500.00	$ 252,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	92	Syd	$ 13.00	$ 1,196.00
Pavt Repr, Nonreinf Conc, 8 inch	92	Syd	$ 90.00	$ 8,280.00
Curb and Gutter, Rem	86	FT	$ 12.00	$ 1,032.00
_ Curb and Gutter, Conc, Det F4, Modified	86	FT	$ 30.00	$ 2,580.00
Sidewalk, Rem	427	Syd	$ 10.00	$ 4,270.00
Sidewalk, Conc, 4 inch	3835	Sft	$ 6.00	$ 23,010.00
Aggregate Base, 6 inch	520	Syd	$ 11.00	$ 5,720.00
_ Driveway, Rem	408	Syd	$ 11.00	$ 4,488.00
Driveway, Nonreinf Conc, 8 inch	408	Syd	$ 60.00	$ 24,480.00
Soil Erosion				
_ Erosion Control, Inlet Filter	14	Each	$ 175.00	$ 2,450.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 67,878.00	$ 67,878.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	7	Each	$ 1,200.00	$ 8,400.00
Tree, Rem, 6 inch to 18 inch	8	Each	$ 750.00	$ 6,000.00
_ Tree, Rem, Less than 6 inch	3	Each	$ 500.00	$ 1,500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 916,359.00
CONSTRUCTION COST				$ 916,359.00
Design Engineering (6.3%)				$ 57,730.00
Construction Engineering (15%)				$ 137,450.00
Material Testing (1.5%)				$ 13,750.00
Contingencies (10%)				$ 91,640.00
TOTAL COST				$ 1,216,929.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
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PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Devonshire Road - Woodward to End

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	2260	FT	$ 8.00	$ 18,080.00
_ Fire Hydrant, Assembely	5	Each	$ 6,000.00	$ 30,000.00
Fire Hydrant, Rem	5	Each	$ 675.00	$ 3,375.00
Gate Valve and Well, 8 inch	3	Each	$ 6,200.00	$ 18,600.00
_Gate Valve and Well, Rem	3	Each	$ 1,000.00	$ 3,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2260	FT	$ 130.00	$ 293,800.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 12 inch	1	Each	$ 7,500.00	$ 7,500.00
Water Service (WM to Valve Box)	38	Each	$ 900.00	$ 34,200.00
Water Service, Long (WM to Valve Box)	36	Each	$ 1,900.00	$ 68,400.00
_ Water Service, Special	74	Each	$ 4,500.00	$ 333,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	392	Syd	$ 13.00	$ 5,096.00
Pavt Repr, Nonreinf Conc, 8 inch	392	Syd	$ 90.00	$ 35,280.00
Curb and Gutter, Rem	484	FT	$ 12.00	$ 5,808.00
_ Curb and Gutter, Conc, Det F4, Modified	484	FT	$ 30.00	$ 14,520.00
Sidewalk, Rem	637	Syd	$ 10.00	$ 6,370.00
Sidewalk, Conc, 4 inch	5029	Sft	$ 6.00	$ 30,174.00
Sidewalk Ramp, Conc, 8 inch	700	Sft	$ 10.50	$ 7,350.00
Aggregate Base, 6 inch	852	Syd	$ 11.00	$ 9,372.00
_ Driveway, Rem	352	Syd	$ 11.00	$ 3,872.00
Driveway, Nonreinf Conc, 8 inch	352	Syd	$ 60.00	$ 21,120.00
Soil Erosion				
_ Erosion Control, Inlet Filter	8	Each	$ 175.00	$ 1,400.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 86,150.00	$ 86,150.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	6	Each	$ 1,200.00	$ 7,200.00
Tree, Rem, 6 inch to 18 inch	13	Each	$ 750.00	$ 9,750.00
_ Tree, Rem, Less than 6 inch	4	Each	$ 500.00	$ 2,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 1,109,017.00
CONSTRUCTION COST				$ 1,109,017.00
Design Engineering (6.2%)				$ 68,760.00
Construction Engineering (15%)				$ 166,350.00
Material Testing (1.5%)				$ 16,640.00
Contingencies (10%)				$ 110,900.00
TOTAL COST				$ 1,471,667.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
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Shelby Township, MI 48315
Phone: 586-726-1234
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PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Wellesley Drive - Woodward to End

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	2170	FT	$ 8.00	$ 17,360.00
_ Fire Hydrant, Assembely	5	Each	$ 6,000.00	$ 30,000.00
Fire Hydrant, Rem	5	Each	$ 675.00	$ 3,375.00
Gate Valve and Well, 8 inch	3	Each	$ 6,200.00	$ 18,600.00
_Gate Valve and Well, Rem	3	Each	$ 1,000.00	$ 3,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2170	FT	$ 130.00	$ 282,100.00
_ Water Main Connection, 6 inch	2	Each	$ 4,000.00	$ 8,000.00
_ Water Main Connection, 12 inch	1	Each	$ 6,000.00	$ 6,000.00
Water Service (WM to Valve Box)	46	Each	$ 900.00	$ 41,400.00
Water Service, Long (WM to Valve Box)	41	Each	$ 1,900.00	$ 77,900.00
_ Water Service, Special	87	Each	$ 4,500.00	$ 391,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	374	Syd	$ 13.00	$ 4,862.00
Pavt Repr, Nonreinf Conc, 8 inch	374	Syd	$ 90.00	$ 33,660.00
Curb and Gutter, Rem	460	FT	$ 12.00	$ 5,520.00
_ Curb and Gutter, Conc, Det F4, Modified	460	FT	$ 30.00	$ 13,800.00
Sidewalk, Rem	689	Syd	$ 10.00	$ 6,890.00
Sidewalk, Conc, 4 inch	5763	Sft	$ 6.00	$ 34,578.00
Sidewalk Ramp, Conc, 8 inch	432	Sft	$ 10.50	$ 4,536.00
Aggregate Base, 6 inch	883	Syd	$ 11.00	$ 9,713.00
_ Driveway, Rem	406	Syd	$ 11.00	$ 4,466.00
Driveway, Nonreinf Conc, 8 inch	406	Syd	$ 60.00	$ 24,360.00
Soil Erosion				
_ Erosion Control, Inlet Filter	9	Each	$ 175.00	$ 1,575.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 87,380.00	$ 87,380.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	6	Each	$ 1,200.00	$ 7,200.00
Tree, Rem, 6 inch to 18 inch	13	Each	$ 750.00	$ 9,750.00
_ Tree, Rem, Less than 6 inch	5	Each	$ 500.00	$ 2,500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 1,179,625.00
CONSTRUCTION COST				$ 1,179,625.00
Design Engineering (6.2%)				$ 73,140.00
Construction Engineering (15%)				$ 176,940.00
Material Testing (1.5%)				$ 17,690.00
Contingencies (10%)				$ 117,960.00
TOTAL COST				$ 1,565,355.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

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PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Amherst Road - Woodward to End

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	2050	FT	$ 8.00	$ 16,400.00
_ Fire Hydrant, Assembely	4	Each	$ 6,000.00	$ 24,000.00
Fire Hydrant, Rem	4	Each	$ 675.00	$ 2,700.00
Gate Valve and Well, 8 inch	4	Each	$ 6,200.00	$ 24,800.00
_Gate Valve and Well, Rem	4	Each	$ 1,000.00	$ 4,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2050	FT	$ 130.00	$ 266,500.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 12 inch	1	Each	$ 6,000.00	$ 6,000.00
Water Service (WM to Valve Box)	33	Each	$ 900.00	$ 29,700.00
Water Service, Long (WM to Valve Box)	43	Each	$ 1,900.00	$ 81,700.00
_ Water Service, Special	76	Each	$ 4,500.00	$ 342,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	83	Syd	$ 13.00	$ 1,079.00
Pavt Repr, Nonreinf Conc, 8 inch	83	Syd	$ 90.00	$ 7,470.00
Curb and Gutter, Rem	74	FT	$ 12.00	$ 888.00
_ Curb and Gutter, Conc, Det F4, Modified	74	FT	$ 30.00	$ 2,220.00
Sidewalk, Rem	609	Syd	$ 10.00	$ 6,090.00
Sidewalk, Conc, 4 inch	5042	Sft	$ 6.00	$ 30,252.00
Sidewalk Ramp, Conc, 8 inch	432	Sft	$ 10.50	$ 4,536.00
Aggregate Base, 6 inch	447	Syd	$ 11.00	$ 4,917.00
_ Driveway, Rem	347	Syd	$ 11.00	$ 3,817.00
Driveway, Nonreinf Conc, 8 inch	347	Syd	$ 60.00	$ 20,820.00
Soil Erosion				
_ Erosion Control, Inlet Filter	10	Each	$ 175.00	$ 1,750.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 76,291.00	$ 76,291.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	2	Each	$ 1,200.00	$ 2,400.00
Tree, Rem, 6 inch to 18 inch	18	Each	$ 750.00	$ 13,500.00
_ Tree, Rem, Less than 6 inch	5	Each	$ 500.00	$ 2,500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 1,029,930.00

CONSTRUCTION COST	$ 1,029,930.00
Design Engineering (6.2%)	$ 63,860.00
Construction Engineering (15%)	$ 154,490.00
Material Teasing (1.5%)	$ 15,450.00
Contingencies (10%)	$ 102,990.00
TOTAL COST	$ 1,366,720.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Maywood Ave. - Woodward to End

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	2060	FT	$ 8.00	$ 16,480.00
_ Fire Hydrant, Assembely	3	Each	$ 6,000.00	$ 18,000.00
Fire Hydrant, Rem	3	Each	$ 675.00	$ 2,025.00
Gate Valve and Well, 8 inch	3	Each	$ 6,200.00	$ 18,600.00
_Gate Valve and Well, Rem	3	Each	$ 1,000.00	$ 3,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2060	FT	$ 130.00	$ 267,800.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	34	Each	$ 900.00	$ 30,600.00
Water Service, Long (WM to Valve Box)	35	Each	$ 1,900.00	$ 66,500.00
_ Water Service, Special	69	Each	$ 4,500.00	$ 310,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	382	Syd	$ 13.00	$ 4,966.00
Pavt Repr, Nonreinf Conc, 8 inch	382	Syd	$ 90.00	$ 34,380.00
Curb and Gutter, Rem	464	FT	$ 12.00	$ 5,568.00
_ Curb and Gutter, Conc, Det F4, Modified	464	FT	$ 30.00	$ 13,920.00
Sidewalk, Rem	610	Syd	$ 10.00	$ 6,100.00
Sidewalk, Conc, 4 inch	4860	Sft	$ 6.00	$ 29,160.00
Sidewalk Ramp, Conc, 8 inch	630	Sft	$ 10.50	$ 6,615.00
Aggregate Base, 6 inch	898	Syd	$ 11.00	$ 9,878.00
_ Driveway, Rem	413	Syd	$ 11.00	$ 4,543.00
Driveway, Nonreinf Conc, 8 inch	413	Syd	$ 60.00	$ 24,780.00
Soil Erosion				
_ Erosion Control, Inlet Filter	9	Each	$ 175.00	$ 1,575.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 76,500.00	$ 76,500.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	2	Each	$ 1,200.00	$ 2,400.00
Tree, Rem, 6 inch to 18 inch	23	Each	$ 750.00	$ 17,250.00
_ Tree, Rem, Less than 6 inch	5	Each	$ 500.00	$ 2,500.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 1,032,740.00

CONSTRUCTION COST	$ 1,032,740.00
Design Engineering (6.2%)	$ 64,030.00
Construction Engineering (15%)	$ 154,910.00
Material Teasing (1.5%)	$ 15,490.00
Contingencies (10%)	$ 103,270.00
TOTAL COST	$ 1,370,440.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Sylvan Ave. - Woodward to End

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	2000	FT	$ 8.00	$ 16,000.00
_ Fire Hydrant, Assembely	3	Each	$ 6,000.00	$ 18,000.00
Fire Hydrant, Rem	3	Each	$ 675.00	$ 2,025.00
Gate Valve and Well, 8 inch	3	Each	$ 6,200.00	$ 18,600.00
_Gate Valve and Well, Rem	3	Each	$ 1,000.00	$ 3,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	2000	FT	$ 130.00	$ 260,000.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	35	Each	$ 900.00	$ 31,500.00
Water Service, Long (WM to Valve Box)	34	Each	$ 1,900.00	$ 64,600.00
_ Water Service, Special	69	Each	$ 4,500.00	$ 310,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	394	Syd	$ 13.00	$ 5,122.00
Pavt Repr, Nonreinf Conc, 8 inch	394	Syd	$ 90.00	$ 35,460.00
Curb and Gutter, Rem	474	FT	$ 12.00	$ 5,688.00
_ Curb and Gutter, Conc, Det F4, Modified	474	FT	$ 30.00	$ 14,220.00
Sidewalk, Rem	584	Syd	$ 10.00	$ 5,840.00
Sidewalk, Conc, 4 inch	4605	Sft	$ 6.00	$ 27,630.00
Sidewalk Ramp, Conc, 8 inch	645	Sft	$ 10.50	$ 6,772.50
Aggregate Base, 6 inch	487	Syd	$ 11.00	$ 5,357.00
_ Driveway, Rem	347	Syd	$ 11.00	$ 3,817.00
Driveway, Nonreinf Conc, 8 inch	347	Syd	$ 60.00	$ 20,820.00
Soil Erosion				
_ Erosion Control, Inlet Filter	11	Each	$ 175.00	$ 1,925.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 74,514.00	$ 74,514.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	1	Each	$ 1,200.00	$ 1,200.00
Tree, Rem, 6 inch to 18 inch	15	Each	$ 750.00	$ 11,250.00
_ Tree, Rem, Less than 6 inch	6	Each	$ 500.00	$ 3,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 1,005,940.50

CONSTRUCTION COST	$ 1,005,940.50
Design Engineering (6.3%)	$ 63,370.00
Construction Engineering (15%)	$ 150,890.00
Material Testing (1.5%)	$ 15,090.00
Contingencies (10%)	$ 100,590.00
TOTAL COST	$ 1,335,880.50

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Fairwood Blvd. - Woodward to End

OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1970	FT	$ 8.00	$ 15,760.00
_ Fire Hydrant, Assembely	3	Each	$ 6,000.00	$ 18,000.00
Fire Hydrant, Rem	3	Each	$ 675.00	$ 2,025.00
Gate Valve and Well, 8 inch	4	Each	$ 6,200.00	$ 24,800.00
_Gate Valve and Well, Rem	4	Each	$ 1,000.00	$ 4,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1970	FT	$ 130.00	$ 256,100.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	32	Each	$ 900.00	$ 28,800.00
Water Service, Long (WM to Valve Box)	32	Each	$ 1,900.00	$ 60,800.00
_ Water Service, Special	64	Each	$ 4,500.00	$ 288,000.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	359	Syd	$ 13.00	$ 4,667.00
Pavt Repr, Nonreinf Conc, 8 inch	359	Syd	$ 90.00	$ 32,310.00
Curb and Gutter, Rem	50	FT	$ 12.00	$ 600.00
_ Curb and Gutter, Conc, Det F4, Modified	50	FT	$ 30.00	$ 1,500.00
Sidewalk, Rem	962	Syd	$ 10.00	$ 9,620.00
Sidewalk, Conc, 4 inch	4326	Sft	$ 6.00	$ 25,956.00
Sidewalk Ramp, Conc, 8 inch	552	Sft	$ 10.50	$ 5,796.00
Aggregate Base, 6 inch	670	Syd	$ 11.00	$ 7,370.00
_ Driveway, Rem	299	Syd	$ 11.00	$ 3,289.00
Driveway, Nonreinf Conc, 8 inch	299	Syd	$ 60.00	$ 17,940.00
Soil Erosion				
_ Erosion Control, Inlet Filter	20	Each	$ 175.00	$ 3,500.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 71,080.00	$ 71,080.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	4	Each	$ 1,200.00	$ 4,800.00
Tree, Rem, 6 inch to 18 inch	13	Each	$ 750.00	$ 9,750.00
_ Tree, Rem, Less than 6 inch	8	Each	$ 500.00	$ 4,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 959,563.00
CONSTRUCTION COST				$ 959,563.00
Design Engineering (6.3%)				$ 60,450.00
Construction Engineering (15%)				$ 143,930.00
Material Testing (1.5%)				$ 14,390.00
Contingencies (10%)				$ 95,960.00
TOTAL COST				$ 1,274,293.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
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PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Woodward Heights Blvd. -
Woodward to East Side
OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE: 1/6/2022

CHECKED BY: Michael D. Smith, PE
DATE: 1/6/2022

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 6 inch	1900	FT	$ 8.00	$ 15,200.00
_ Fire Hydrant, Assembely	2	Each	$ 6,000.00	$ 12,000.00
Fire Hydrant, Rem	2	Each	$ 675.00	$ 1,350.00
Gate Valve and Well, 8 inch	2	Each	$ 6,200.00	$ 12,400.00
_Gate Valve and Well, Rem	2	Each	$ 1,000.00	$ 2,000.00
_ Water Main, C900 PVC, 8 inch, Directional Drill	1900	FT	$ 130.00	$ 247,000.00
_ Water Main Connection, 6 inch	1	Each	$ 4,000.00	$ 4,000.00
_ Water Main Connection, 10 inch	1	Each	$ 5,500.00	$ 5,500.00
Water Service (WM to Valve Box)	30	Each	$ 900.00	$ 27,000.00
Water Service, Long (WM to Valve Box)	37	Each	$ 1,900.00	$ 70,300.00
_ Water Service, Special	67	Each	$ 4,500.00	$ 301,500.00
_ Mismarked Water Services	16	Hrs	$ 350.00	$ 5,600.00
Pavement				
Pavt Repr, Rem	206	Syd	$ 13.00	$ 2,678.00
Pavt Repr, Nonreinf Conc, 8 inch	206	Syd	$ 90.00	$ 18,540.00
Curb and Gutter, Rem	442	FT	$ 12.00	$ 5,304.00
_ Curb and Gutter, Conc, Det F4, Modified	442	FT	$ 30.00	$ 13,260.00
Sidewalk, Rem	516	Syd	$ 10.00	$ 5,160.00
Sidewalk, Conc, 4 inch	4435	Sft	$ 6.00	$ 26,610.00
Sidewalk Ramp, Conc, 8 inch	206	Sft	$ 10.50	$ 2,163.00
Aggregate Base, 6 inch	518	Syd	$ 11.00	$ 5,698.00
_ Driveway, Rem	213	Syd	$ 11.00	$ 2,343.00
Driveway, Nonreinf Conc, 8 inch	213	Syd	$ 60.00	$ 12,780.00
Soil Erosion				
_ Erosion Control, Inlet Filter	14	Each	$ 175.00	$ 2,450.00
_ Turf Establishment	1	LSUM	$ 10,000.00	$ 10,000.00
MISC Work				
Mobilization, Max 8%	1	LSUM	$ 68,895.00	$ 68,895.00
_ Traffic Control & Maintainance	1	LSUM	$ 5,000.00	$ 5,000.00
_ Permitting Allowance	1	LSUM	$ 1,500.00	$ 1,500.00
Tree, Rem, 19 inch to 36 inch	3	Each	$ 1,200.00	$ 3,600.00
Tree, Rem, 6 inch to 18 inch	13	Each	$ 750.00	$ 9,750.00
_ Tree, Rem, Less than 6 inch	6	Each	$ 500.00	$ 3,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	500	TON	$ 50.00	$ 25,000.00
			TOTAL COST	$ 930,081.00
CONSTRUCTION COST				$ 930,081.00
Design Engineering (6.3%)				$ 58,600.00
Construction Engineering (15%)				$ 139,510.00
Material Testing (1.5%)				$ 13,950.00
Contingencies (10%)				$ 93,010.00
TOTAL COST				$ 1,235,151.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
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Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PRELIMINARY ESTIMATE

AEW PROJECT NO. 0175-0120

PROJECT: Water Asset Management Report Updates
Woodward Ave (Oakland Park to Elm Park)

OWNER: City of Pleasant Ridge

PREPARED BY: Brett McDonald
DATE: 1/6/2021

CHECKED BY:
DATE:

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main				
_ Water Main Abandon, 10 inch	0	FT	$ 11.00	$ -
_ Fire Hydrant, Assembely	3	Each	$ 5,000.00	$ 15,000.00
Fire Hydrant, Rem	0	Each	$ 675.00	$ -
Gate Valve and Well, 12 inch	3	Each	$ 8,500.00	$ 25,500.00
_Gate Valve and Well, Rem	0	Each	$ 1,000.00	$ -
_ Water Main, C900 PVC, 12 inch, Directional Drill	600	FT	$ 215.00	$ 129,000.00
_ Water Main Connection, 8 inch	2	Each	$ 4,500.00	$ 9,000.00
_ Water Main Connection, 12 inch	2	Each	$ 7,500.00	$ 15,000.00
Water Service, Short (WM to Valve Box)	0	Each	$ 900.00	$ -
_ Water Service, Special	0	Each	$ 4,500.00	$ -
_ Mismarked Water Services	6	Hrs	$ 350.00	$ 2,100.00
Pavement				
Pavt Repr, Rem	92	Syd	$ 10.00	$ 920.00
Pavt Repr, Nonreinf Conc, 8 inch	92	Syd	$ 90.00	$ 8,280.00
Curb and Gutter, Rem	86	FT	$ 10.00	$ 860.00
_ Curb and Gutter, Conc, Det F4, Modified	86	FT	$ 25.00	$ 2,150.00
Sidewalk, Rem	333	Syd	$ 9.00	$ 3,000.00
Sidewalk, Conc, 4 inch	3000	Sft	$ 6.00	$ 18,000.00
Sidewalk Ramp, Conc, 8 inch	240	Sft	$ 9.50	$ 2,280.00
Aggregate Base, 6 inch	202	Syd	$ 10.00	$ 2,020.00
Soil Erosion				
Erosion Control & Turf Establishment	1	LSUM	$ 15,000.00	$ 15,000.00
Misc Work				
Mobilization, Max 8%	1	LSUM	$ 21,500.00	$ 21,500.00
_ Traffic Control & Maintainance	1	LSUM	$ 7,500.00	$ 7,500.00
_ Permitting Allowance	1	LSUM	$ 5,000.00	$ 5,000.00
Tree, Rem, 6 inch to 18 inch	2	Each	$ 1,000.00	$ 2,000.00
_ Audio Visual Record of Construction Area	1	LSUM	$ 2,500.00	$ 2,500.00
Maintenance Gravel	300	TON	$ 50.00	$ 15,000.00
			TOTAL COST	$ 301,610.00
CONSTRUCTION COST				$ 301,610.00
Design Engineering (9.5%)				$ 28,650.00
Construction Engineering (15%)				$ 45,240.00
Material Testing (2.5%)				$ 7,540.00
Contingencies (15%)				$ 45,240.00
TOTAL COST				$ 428,280.00

NOTE:
Design Engineering includes topographical survey, design and preparation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

PROJECT NAME: Water Asset Management Report Updates (Indiana Ave, N.C.L. to Fairwood and crossing Woodward.)
OWNER: City of Pleasant Ridge

PREPARED BY: Nick Todino
DATE:

CHECKED BY:
DATE:

PRELIMINARY ENGINEER'S ESTIMATE

AEW PROJECT NO.: 0175-0120

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Misc Work				
1. Mobilization, Max 8%	1	LSUM	$55,000	$55,000
2. _Traffic Control & Maintenance	1	LSUM	$10,000	$10,000
3. _Permitting Allowance	1	LSUM	$5,000	$5,000
4. _Audio Visual Record of Construction Area	1	LSUM	$3,000	$3,000
5. Maintenance Gravel	300	TON	$50	$15,000
			Misc Work Subtotal	**$90,000**
Water Main				
6. _Water Main Abandon, 6 inch	550	FT	$8	$4,400
7. _Fire Hydrant, Assembely	1	Each	$5,000	$5,000
8. Fire Hydrant, Rem	1	Each	$675	$675
9. Gate Valve and Well, 8 inch	9	Each	$6,200	$55,800
10. Gate Valve and Well, 12 inch	1	Each	$8,500	$8,500
11. _Gate Valve and Well, Rem	1	Each	$1,000	$1,000
12. _Water Main, C900 PVC, 8 inch, Directional Drill	2,800	FT	$135	$378,000
13. _Water Main, C900 PVC, 12 inch, Directional Drill	200	FT	$180	$36,000
14. _Water Main Connection, 6 inch	8	Each	$3,500	$28,000
15. _Water Main Connection, 10 inch	1	Each	$5,500	$5,500
16. _Water Main Connection, 12 inch	1	Each	$7,500	$7,500
17. 48" connection to SOCWA?	1	Each	?	
18. Water Service (WM to Valve Box)	7	Each	$900	$6,300
19. Water Service, Long (WM to Valve Box)	6	Each	$1,900	$11,400
20. _Water Service, Special	13	Each	$4,500	$58,500
21. _Mismarked Water Services	16	Hrs	$350	$5,600
			Water Main Subtotal	**$620,000**
Paving				
22. Pavt Repr, Rem	60	Syd	$10	$600
23. Pavt Repr, Nonreinf Conc, 8 inch	60	Syd	$90	$5,400
24. Curb and Gutter, Rem	100	FT	$10	$1,000
25. _Curb and Gutter, Conc, Det F4, Modified	100	FT	$25	$2,500
26. Sidewalk, Rem	50	Syd	$9	$450
27. Sidewalk, Conc, 4 inch	260	Sft	$6	$1,560
28. Sidewalk Ramp, Conc, 8 inch	180	Sft	$10	$1,710
29. Aggregate Base, 6 inch	83	Syd	$10	$830
30. _Temp HMA Surface, 2 inch	2	TON	$175	$350
			Paving Subtotal	**$20,000**
Soil Erosion				
31. _Erosion Control, Inlet Filter	41	Each	$175	$7,175
32. _Turf Establishment	1	LSUM	$10,000	$10,000
			Soil Erosion Subtotal	**$18,000**
			Construction Subtotal	**$750,000**
			Design Engineering (6.6%)	$49,500
			Construction Administration & Engineering (15%)	$112,500
			Material Testing Services (2.5%)	$18,750
			Geotechnical Services - Soil Borings (1%)	$7,500
			Subtotal	**$189,000**
			GRAND TOTAL	**$940,000**

NOTE:
Design Engineering includes topographical survey, design and preperation of bid documents.
Construction Engineering includes contract administration, construction observation and staking services.

APPENDIX I

GLWA Source Water Protection Plan

Great Lakes Water Authority

Surface Water Intake Protection Plan

Belle Isle Intake

October 14, 2021

Surface Water Intake Protection Plan

Belle Isle Intake

Prepared For:

Great Lakes Water Authority

10100 E. Jefferson

Detroit, MI 48214

Prepared By:

Arcadis of Michigan, LLC

607 Shelby Street, Suite 400

Detroit

Michigan 48226

Phone: 313 965 8436

Date:

October 14, 2021

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Acronyms and Abbreviations

CAZ	Critical Assessment Zone
CEO	Chief Executive Officer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COO	Chief Operating Officer
CSO	Combined Sewer Overflow
CY	Calendar Year
DO	Dissolved Oxygen
DNAPL	None-aqueous dense phase liquids
DWSD	Detroit Water and Sewerage Department
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EOC	Emergency Operations Center
EOP	Emergency Operating Plan
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ERSPA	Essex Region Source Protection Area
ERSWA	Essex Region Source Water Area Protection Plan
hrs	hours
GLWA	Great Lakes Water Authority
GSI	groundwater-surface water interface
IDEP	Illicit Discharge Elimination Program
IPP	Industrial Pre-treatment Program
IPZ	Intake Protection Zone
IWC	Industrial Waste Control
km	kilometers
LARA	Licensing and Regulatory Affairs
LEPC	Local Emergency Planning Committee
LH	Lake Huron
LSCW	Lake St. Clair Direct Drainage Sub watershed
MDEQ	Michigan Department of Environmental Quality
MDHHS	Michigan Department of Health and Human Services

MECP	Ministry of Environment, Conservation and Parks
MG	Million gallons
MGD	Million gallons per day
mi	miles
MIHAN	Michigan Health Alert Network
MPART	Michigan PFAS Action Response Team
MSP	Michigan State Police
MWEA	Michigan Water and Environment Association
NE	Northeast
NPDES	National Pollutant Discharge Elimination
NPS	Non-Point Source
NPMS	National Pipeline Mapping System
NRC	National Response Center
NREPA	Natural Resources and Environmental Protection Act
ORP	Oxidation-reduction potential
PCB	Polychlorinated biphenyl
PEAS	Pollution Emergency Alerting System
PHMSA	Pipeline and Hazardous Materials Safety Administration
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PPCPs	pharmaceuticals and personal care products
ppt	Parts per trillion
psi	Pound-force per square inch
RCRAInfo	Resource Conservation and Recovery Act Information
RRD	Remediation and Redevelopment Division
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEMCOG	Southeast Michigan Council of Governments
SPW	Springwells
SSO	Sanitary Sewer Overflow
SW	Southwest

SWA	Source Water Area
SWAP	Source Water Assessment Program
SWIPP	Source Water Intake Protection Program
SWP	Source Water Protection
TAC	Technical Advisory Committee
TOC	Total Organic Carbon
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
UCMR	Unregulated Contaminants Monitoring Rule
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WCUS	Waterborne Commerce of the United States
WRRF	Water Resource Recovery Facility
WTP	Water Treatment Plant
WWP	Water Works Park
WWTP	Wastewater Treatment Plant

1 Introduction

The Michigan Department of Environmental Quality (MDEQ), now known as Michigan Department of Environment, Great Lakes, and Energy (EGLE)), conducted source water assessments of Great Lake Water Authority's (GLWA) intakes in 2004 under the Source Water Assessment Program (SWAP). These assessments of the Lake Huron, Belle Isle, and Fighting Island intakes were required by the 1996 reauthorization of the EPA Safe Drinking Water Act (SDWA). These SDWA amendments required delineation of source water areas, inventories of and susceptibility to potential sources of contamination, and dissemination of public information. Findings included categorization of the Belle Isle intake as "highly susceptible to potential contamination". This assessment provides an understanding of current conditions and serves as the basis for the current, voluntary, GLWA Surface Water Intake Protection Program (SWIPP).

In building from an assessment to a plan, a watershed approach is engaged. The watershed approach is best to address water quality problems, compiling multi-stakeholder efforts within hydrologically defined boundaries to protect water resources and thereby source water. Various practitioners from within the source water areas as well as relevant governmental units comprise the multi-stakeholder group which will execute the initial plan and continually update and refine the plan. The GLWA and the general public are expected to benefit by implementing this SWIPP, which prescribes efficient and economical means of source water protection (SWP) allowing the GLWA to continue to produce high quality drinking water for millions of GLWA customers in Southeast Michigan.

1.1 SWIPP Goals and Requirements

This SWIPP was developed in accordance with the EGLE Office of Drinking Water and Municipal Assistance guidance dated August 5, 2004, and the Michigan Safe Drinking Water Act 399 Part 28. The goal of the SWIPP is to assemble a Regional Surface Water Intake Protection Team to develop a feasible SWIPP Implementation Plan, including characterization of existing and future risks to source water, and achievable steps to be taken to manage risk over time. The program has the following requirements:

1. Definition of roles and duties of government units and water supply agencies.
2. Delineation of a source water protection area for the Belle Isle Intake, based on the United States Geological Survey (USGS)/EGLE defined source water area.
3. Identification of potential contaminant sources within the source water protection area.
4. Management approaches for protection of source water, including education and regulatory approaches.
5. Contingency plans for public water supply sources including the location of alternate drinking water sources.
6. Siting procedures for new water sources to minimize potential contamination.
7. Public participation.

1.2 Service Area and Community Locations

The GLWA is one of the largest water utilities in the nation, providing water to approximately 40% of Michigan's population throughout southeastern Michigan. The 1,079 square mile service area includes the City of Detroit and 126 suburban communities throughout Wayne, Oakland, Macomb, St. Clair, Lapeer, Genesee, Washtenaw, and Monroe Counties and serves approximately 3.8 million residents. The water supply transmits treated water across the service area through over 3,800 miles of transmission and distribution mains. Five GLWA water treatment plants (WTPs) pump an average of 525 million gallons per day (MGD) with a combined total peak capacity of 1,720 MGD.

The system draws fresh water from the Great Lakes system, which is shared with Canada. GLWA maintains and operates three raw water intakes: one in Lake Huron and two in the Detroit River:

1. Lake Huron Intake: located in Lake Huron north of Port Huron and east of Lake Port.
2. Belle Isle Intake: located in a protective lagoon on Belle Isle in the Detroit River.
3. Fighting Island Intake: Located in the Detroit River west of Fighting Island, in Canadian waters.

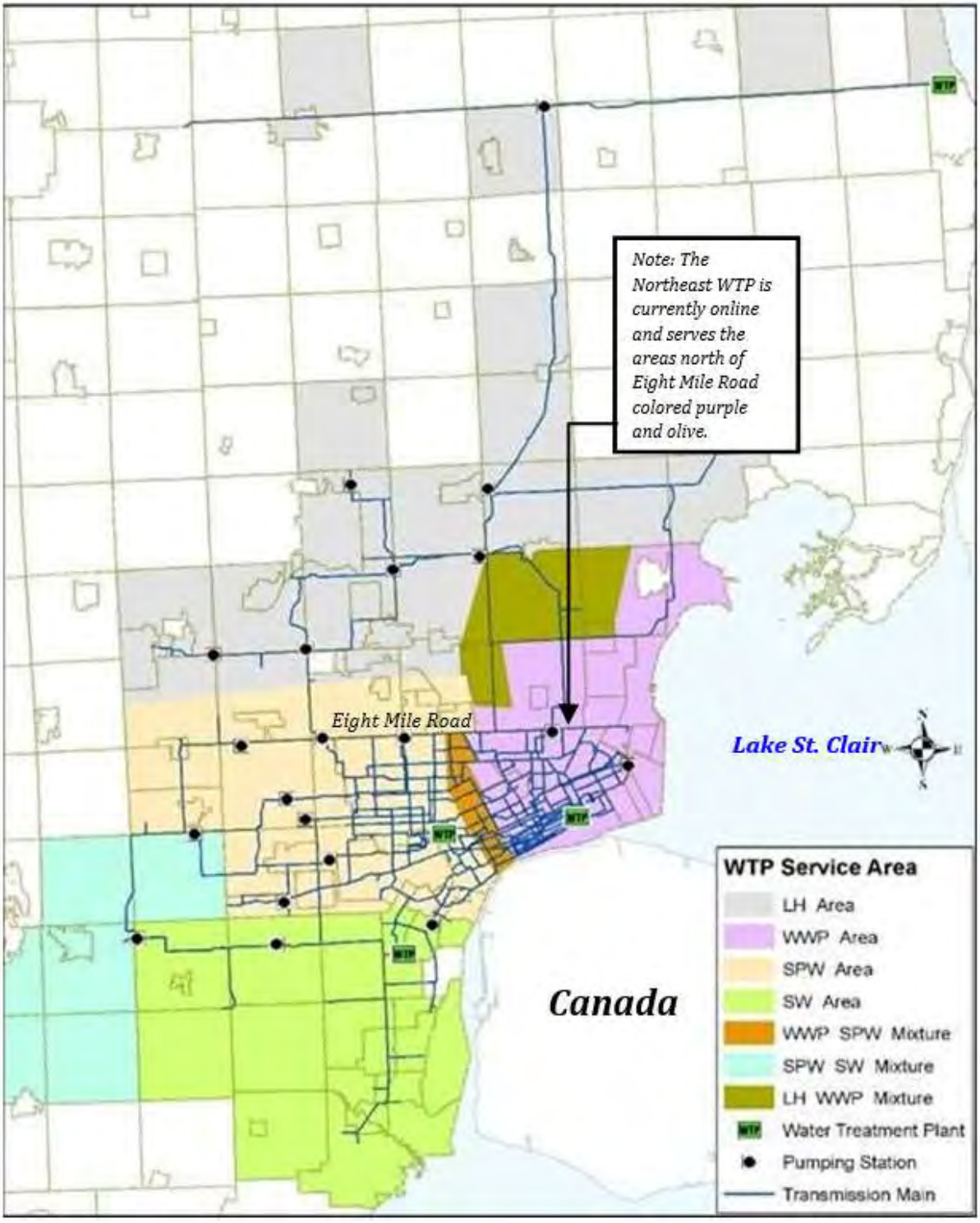

Figure 1-1 contains the services area limits and general location of the water treatment plants.

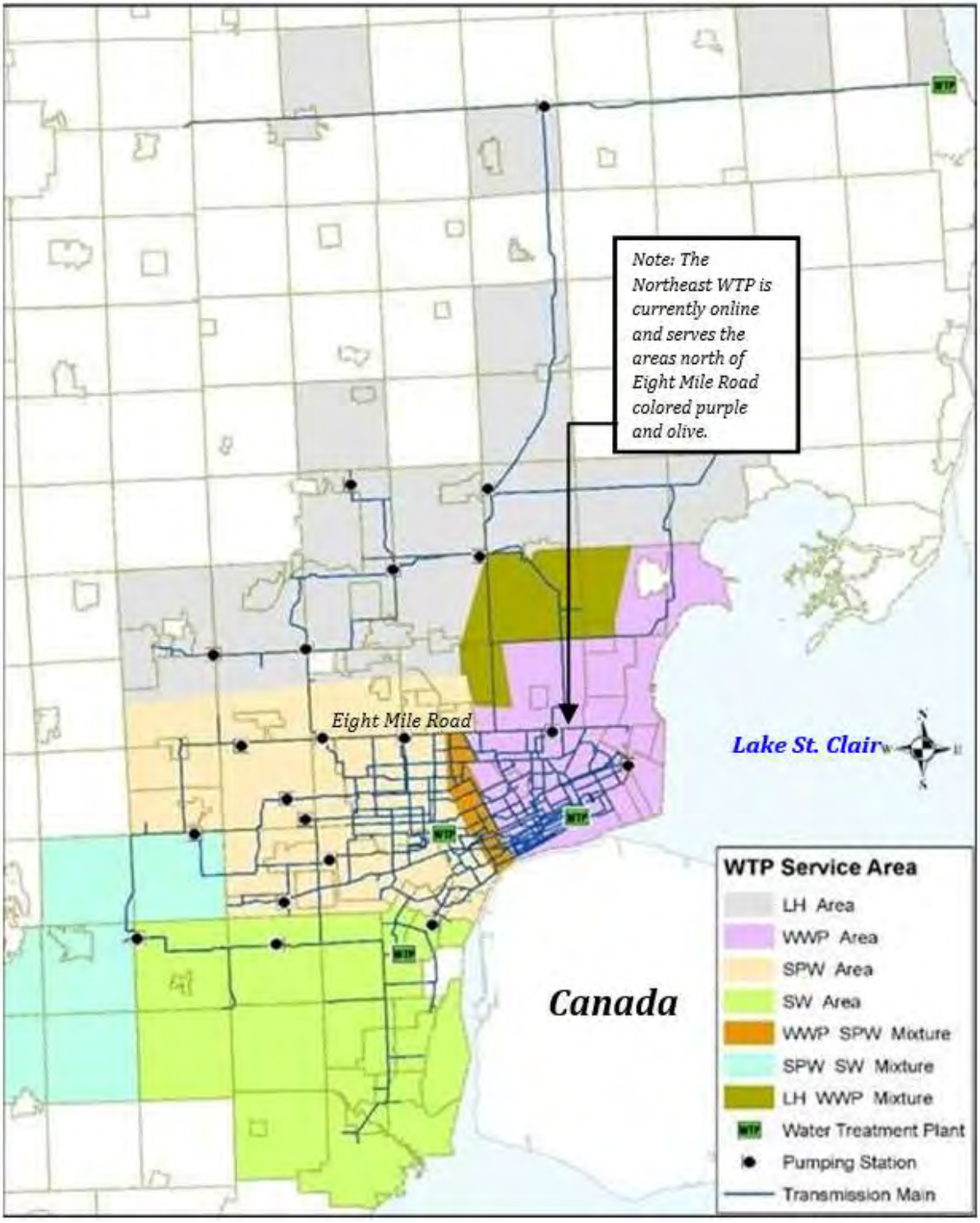

Figure 1-1: 2035 Service Areas for Average Daily Demand

1.3 Existing Facilities

The Detroit Water and Sewerage Department (DWSD) was established in 1824 as a branch of the City of Detroit Government and grew to own and operate five water treatment plants: the Northeast (NE), Springwells (SPW), Southwest (SW), Lake Huron (LH), and Water Works Park (WWP) Water Treatment Plants. GLWA was formed in 2016 and currently leases the intakes, water treatment plants, and transmission infrastructure from DWSD.

The Belle Isle Intake is a caisson-type intake located on the north side of Belle Isle in a protective lagoon that allows for the settling of solids in advance of water intake. The lagoon is approximately 2,700 feet long, 500 feet wide, and 30 feet deep. The entrance to the lagoon is spanned by three floating wooden booms to protect the intake structure from ice and large river debris. Twenty 7-foot by 20-foot intake ports and two intake shafts are housed in the structure with an estimated capacity of 1,200 MGD. Two 10-foot by 13-foot emergency tunnels enter the intake structure downriver from the lagoon. Seasonal control of Zebra mussels is practiced though sodium hypochlorite application at the intake.

The emergency intake tunnels enter the raw water intake structure on the down river side. Water flows through this tunnel to the WWP intake tunnel which is controlled by six hydraulically operated 78-inch diameter poppet valves. As the bar racks plug in the normal intake structure, a pressure differential between the top and bottom of the poppet valves develops. When this pressure difference reaches between 1.5 to 2.0 feet, the valves open automatically. The emergency intake system can be manually operated and exercised by operations staff.

One of two intake shafts supplies water to the WWP WTP via a 10-foot diameter tunnel. The conventional WTP was rebuilt in 2003 using ozone disinfection and has a maximum capacity of 240 MGD with 28 million gallons (MG) of finished water storage. The facility services the east side of Detroit and the east side of Wayne County.

The second intake shaft is 15.5-feet in diameter and services two WTPs – SPW and NE WTP. SPW WTP is a conventional WTP first built in 1930 and expanded in 1958 and NE WTP is a conventional WTP that was built in 1956.

The Belle Isle Intake supplies 70% of the GLWA water supply and therefore is the most critical GLWA asset under consideration of this Surface Water Intake Protection Plan. The maximum capacity of the intake, 1,200 MGD, is much greater than the average daily demand of 525 MGD. Therefore, the facility serves as an important backup supply of water in the event of an incident at one or both of the other intakes (see section 5.1).

Summary statistics for the Belle Isle intake and WWP, SPW, and NE WTPs are summarized in **Tables 1-1 and 1-2**, respectively.

Table 1-1: Belle Isle Intake Summary

Intake	Type	Location	Capacity (MGD)	Serving
Belle Isle	Caisson	Detroit River	1,200	Water Works, Springwells, Northeast WTPs; Detroit; Wayne, Eastern Washtenaw, Oakland, Macomb,

Table 1-2: Summary of GLWA WTPs supplied by Belle Isle Intake

WTP	Rated Treatment Capacity (MGD)	Ave Daily Demand (MGD)	Firm High Service Pumping Capacity (MGD)	Right-Sized Capacity (MGD)	Storage (MG)
Water Works	240	80	560	240	28
Springwells	540	175	690[1]	360	60
Northeast	300	105	400	0	30

1. 260 MGD intermediate pressure district; 450 MGD high pressure district.

The GLWA Water Transmission System is divided into three pressure districts categorized as low, intermediate, and high pressure. The low-pressure district is served by the WWP WTP and includes the Detroit Central Business District and the lower east side of Detroit. The intermediate pressure district is served by the SPW WTP and includes southwest Detroit (excluding the Central Business District) and the downriver suburban areas. The high-pressure district is served by the NE and SPW WTPs and includes the northern portion of Detroit, the north and northwest suburbs (**Figure 1-1**).

The 2015 Water Master Plan Update recommended the consolidation of water treatment plant capacity from 1,720 MGD at 5 plants to 1,040 MGD at 4 plants. The Northeast Water Treatment Plant will be repurposed to a high lift pump station and administrative offices. The LH, SPW, WWP and SW water treatment plants will be optimized to a firm capacity of 1,040 MGD. The 2015 Water Master Plan Update also recommended a series of improvements to the plants, pumping stations, reservoirs, transmission mains, and City of Detroit distribution system over the 20-year period from 2015 to 2035. The goals of these improvements are continued regulatory compliance, operating efficiency, reduction in water loss, and customer service.

1.4 Community Populations

The current and projected population of the counties included in the metro-Detroit area is summarized in **Table 1-3**. Populations for Macomb, Oakland, St. Clair, Wayne, and Washtenaw counties are represented due to their proximities to the intake location and their subsequent impact on the quality of the source water. The data is based on the most recent Southeast Michigan Council of Governments (SEMCOG) regional forecast completed in 2018. Expected trends indicate a small population increase over the next 30 years. From 2015 to 2045, the projected net population increase is 6.81%.

Table 1-3: Detroit-Area Population Projection

Year	Population of Metropolitan Counties
2015	4,386,479
2025	4,461,806
2035	4,599,506
2045	4,707,082

1.5 Land Use

This section provides an inventory of the current and projected future land uses within the source water areas (SWA) tributary to the water supply of the Belle Isle intake. Land use and land use activities occurring within the watersheds tributary to the source water supply of the intake can affect the quality of drinking water if contaminants generated as a result of land use practices or activities are conveyed from the watershed and

combined with the source water supply. The SWA is defined as the land and water upstream of the intake that has the potential to directly influence the quality of water at the intake. The SWA for the Belle Isle intake was previously delineated during the development of the Source Water Assessment Report in 2004. Further discussion of the SWA boundaries for the intake is provided in Section 3.

Current land use associated activity may present its own unique threats to the source water supply; however, the primary threats to drinking source water quality are related to chemical or pathogens released to the environment through various point or non-point source contaminant pathways.

The investigation of land use as it relates to potential sources of contamination to the drinking water source has also been extended to the Essex County region of Ontario, Canada. The watersheds of Essex County are tributary to Lake St. Clair and the Detroit River, and therefore have the potential to influence the quality of the drinking water source of the Belle Isle intake on the Detroit River.

An inventory of those land use activities and associated contaminants that pose significant risk to source water quality provides a basis for future monitoring of activities or implementation of measures to minimize the level of contaminant threat. The inventory of land use activities/contaminant sources can also provide guidance for land use planning officials, so future land development does not compound existing threats or create new threats to the drinking water source.

The following section presents existing land uses within the SWA of the Belle Isle intake. Future land use projections within the SWA were determined from master planning and watershed management studies completed by local and regional governmental planning groups.

1.5.1 Land Use Belle Isle Intake SWA

Land use data for Southeast Michigan was obtained directly from SEMCOG for the purposes of this report. **Table 1-4** lists land uses within the SWA of the Belle Isle Intake and provides the total land area associated with each land use classification. The area associated with each land use classification is also expressed as a percentage of the total SWA. The distribution of the various land uses throughout the Belle Isle Intake SWA is illustrated on **Figure 1-2**.

The Belle Isle Intake SWA is a highly urbanized area. The predominant land use within the Belle Isle Intake SWA is single-family residential, which accounts for approximately 44% of the area within the SWA. The other principal land use activities within SWA include transportation, communication and utility corridors (25%), and industrial, commercial and institutional land use activities (15%). Those communities outside of the City of Detroit towards the north tend to be characterized as having a higher percentage of land use associated with single family residential use (>70%). Land use associated with parks and recreation accounted for approximately 6% of the overall SWA. Much of the wetland and forested area within the SWA had originally been drained or cleared for farmland, which was later displaced by urban development.

Table 1-4: Land Use and Land Cover Breakdown of SWA of the Belle Isle Intake

Land-Use Activity	Area (Acres)	Percent of Total %
Residential	29,118	44.1%
TCU*	16,481	25.0%
ICI**	9,895	15.0%
Vacant	5,941	9.0%

Land-Use Activity	Area (Acres)	Percent of Total %
Park/Recreational	4,229	6.4%
Airport	288	0.4%
Open Water Body	80	0.1%
Agricultural	10	0.0%
TOTAL	***66,042***	***100%***

*Transportation, Communication, Utility Corridor

**Industrial, Commercial, Institutional

Source: SEMCOG Land Use Data, Updated 2021.

The SWA includes all or portions of the cities of Detroit, Grosse Pointe Park, Grosse Pointe, Grosse Pointe Farms, Grosse Pointe Woods, Harper Woods, Eastpointe, Roseville, St. Clair Shores, Village of Grosse Pointe Shores and Lake and Harrison Townships. The land use activities of the portion of the City of Detroit located along the riverfront includes a mixture of residential, industrial, and commercial activities. In those communities located on the Lake St. Clair shoreline north of Detroit, land use activities are primarily residential, with smaller areas of commercial and recreational land use.

The projected future land use within the SWA is based on SEMCOG 2030 projected land use of communities within SWA. The projected land use for 2030 indicates that residential land use will increase slightly. Commercial, industrial, and institutional land uses have decreased since 2008 but are expected to remain relatively unchanged. Open water body land uses have decreased slightly since 2008, while parks/recreational land uses have increased.

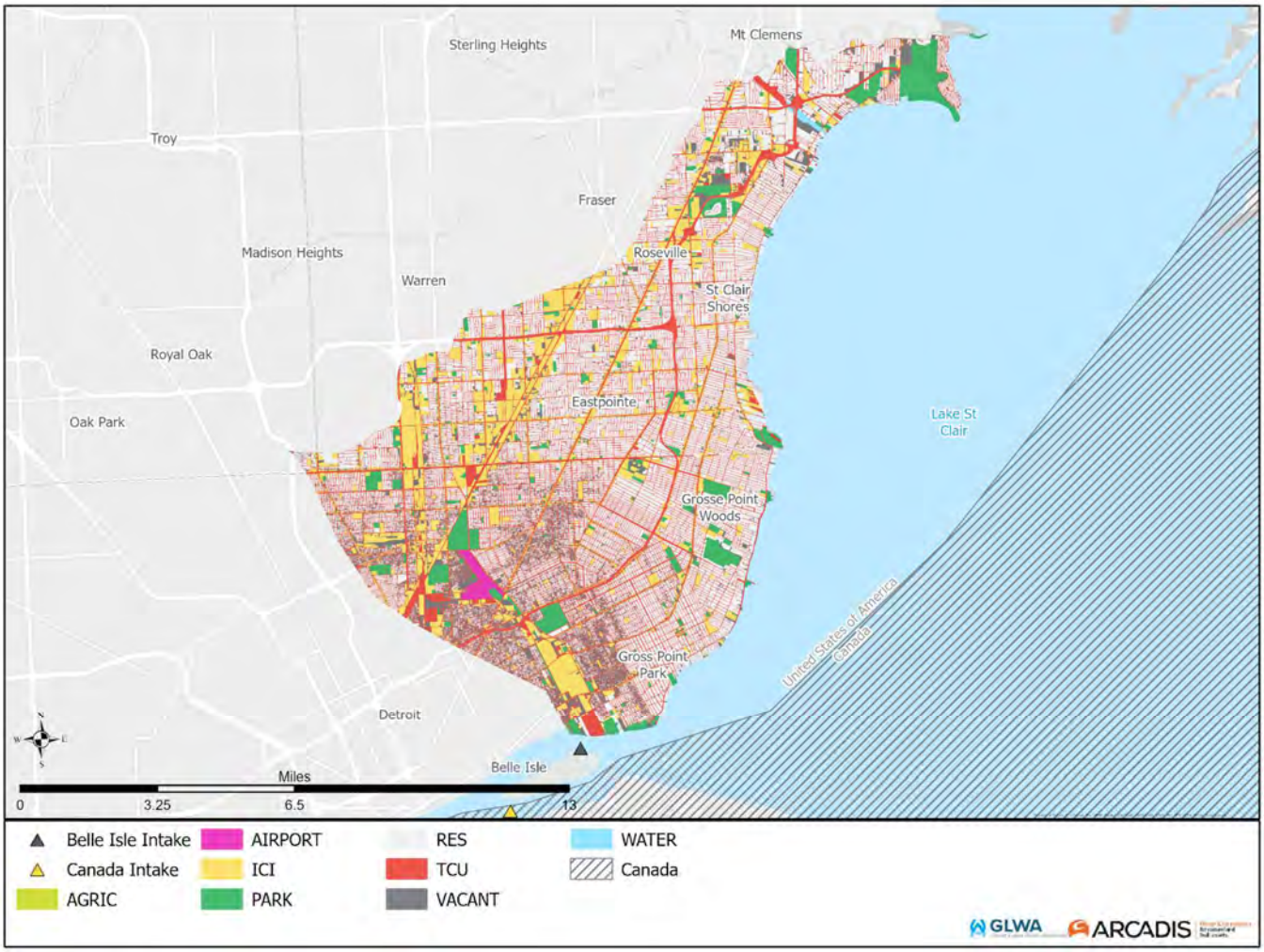

Figure 1-2: Current Land Use, Belle Isle Intake Source Water Area

1.5.2 Land Use, Essex Region Source Protection Area, Ontario, Canada

The Essex Region of Ontario, Canada is located opposite the U.S. shoreline along the Detroit River (Figure 1-3**).** In March 2015, the Essex Region Source Protection Authority along with the Ministry of Environment, Conservation and Parks (MECP) completed a Source Protection Plan for the region that in part developed policies to address significant threats to drinking water quality within the region. One element of this effort included the development of the Essex Region Source Protection Area (ERSPA) Assessment Report that assessed the vulnerability of the Region's drinking source water at the municipal water intakes located within the region on Lake St Clair, the Detroit River and Lake Erie, and identified threats to the drinking source water from potential contaminant sources located within the watersheds of the Essex Region.

The Essex Region encompasses numerous sub watersheds that generally flow within three primary drainage basins either northward to Lake St. Clair, west to the Detroit River or south to Lake Erie (**Figure 1-4).**

Source: *Essex Region Source Protection Area – Updated Assessment Report, 2015.*

Figure 1-3: Current Land Use, Essex Region Source Protection Area

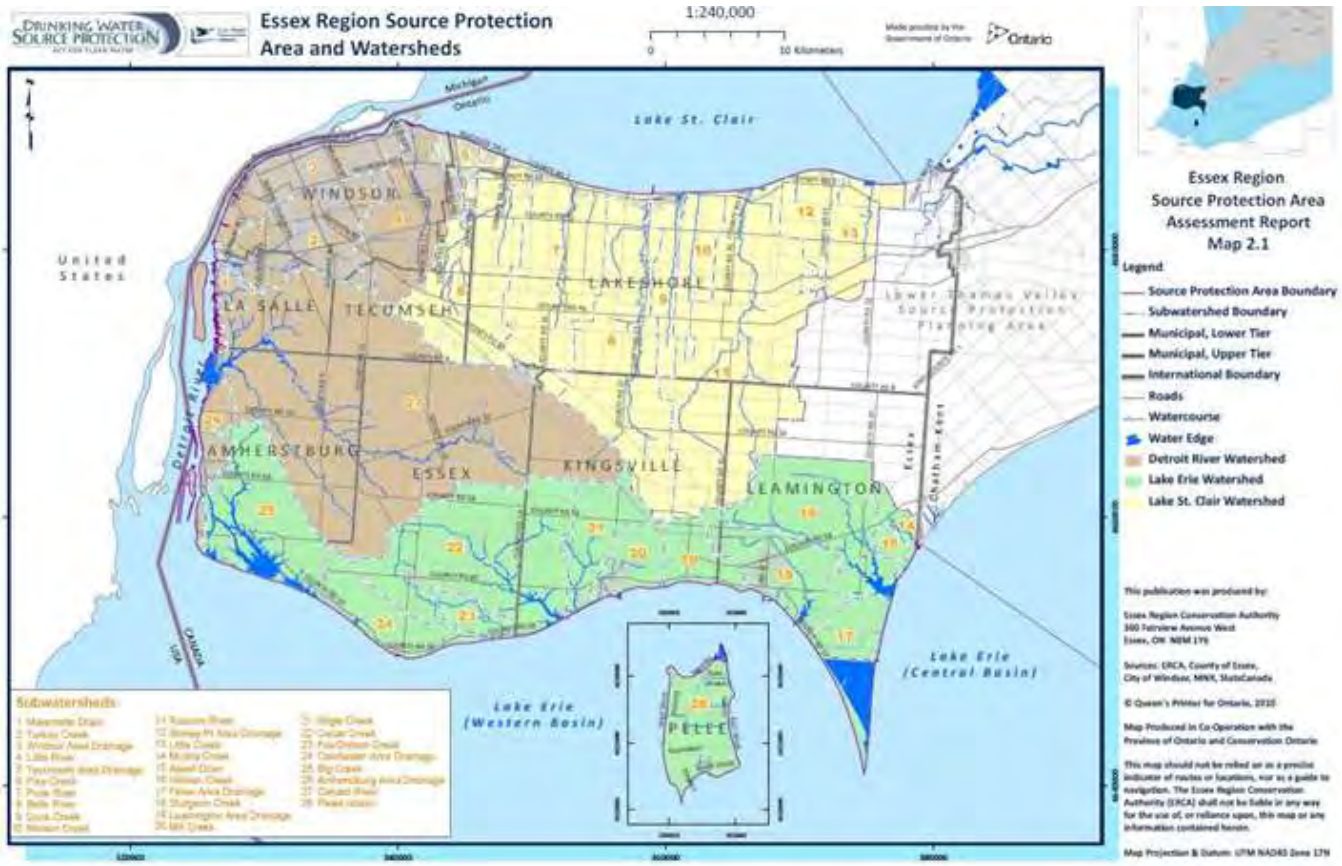

Figure 1-4: Essex Region Source Protection Area - Primary Drainage Basins

Source: Essex Region Source Protection Area – Updated Assessment Report, 2015.

Table 1-5 provides a listing of the size of the three drainage areas.

Source: Essex Region Source Protection Area – Updated Assessment Report, 2015.

Figure 1-3: Current Land Use, Essex Region Source Protection Area

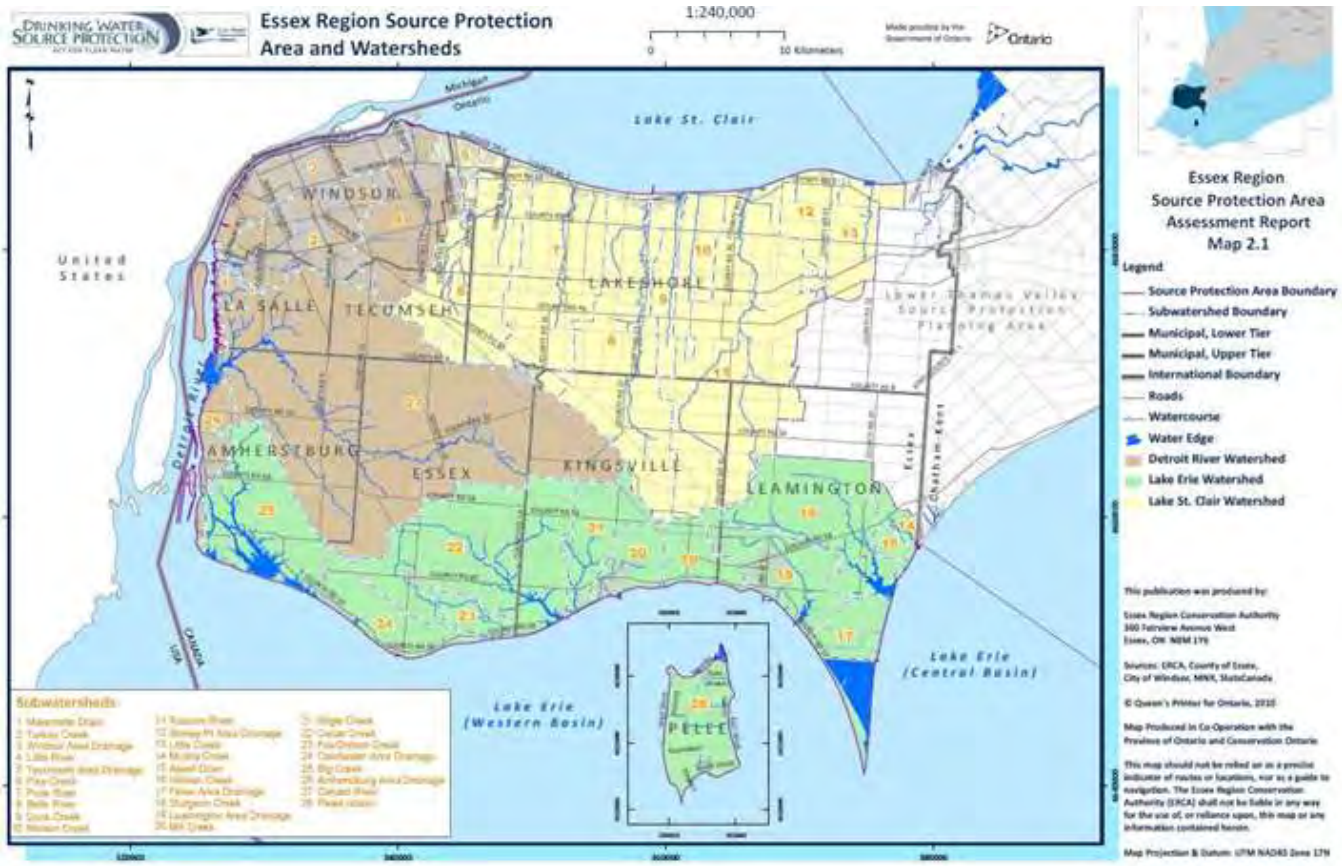

Figure 1-4: Essex Region Source Protection Area - Primary Drainage Basins

Source: Essex Region Source Protection Area – Updated Assessment Report, 2015.

Table 1-5: Drainage Areas in the Essex Region Source Protection Area

Drainage Basin	Area km² (mi²)	Area (Acres)
Lake Erie	239.7 (93)	59,231
Detroit River	218.0 (84)	53,869
Lake St. Clair	425.8 (164)	105,217
TOTAL	**883.5 (341)**	**218,317**

Source: Essex Region Source Protection Area, Updated Assessment Report, March, 2015.

Table 1-6 lists the current land uses within the sub watersheds of the Essex Region and provides the total land area associated with each land use classification. The area associated with each land use classification is also expressed as a percentage of the total Essex Region area.

The ERSPA - Updated Assessment Report describes the land of the Essex Region as relatively flat. The predominant land use in the region is agricultural (77%). The City of Windsor and surrounding suburbs located in the northwest portion of the Essex Region are the most urbanized areas of the region. Smaller urban centers are also located within the Region. Urban areas make up approximately 15% of total land area. The Updated Assessment Report indicates that the shoreline surrounding the Essex Region is mostly privately owned and

developed, primarily with residential uses, and numerous marinas, beaches and other water-based recreational activities. Natural areas (forested/wetlands) comprise 8.5% of the total area.

Table 1-6: Current Land Use in the Essex Region

Land Use Classification	Area km² (mi²)	Area (Acres)	Percent Coverage
Agriculture/Other	1,291 (498)	319,100	77.1%
Urban Areas	243 (94)	60,100	14.5%
Woodlots	113 (44)	27,900	6.8%
Wetlands	26 (10)	6,500	1.6%

Urban areas include residential, commercial, industrial, mixed, open & recreational; natural land areas include woodlots and wetlands.

Source: Essex Region Source Protection Area, Updated Assessment Report, March 2015.

Table 1-7 projects future land use for the Essex Region. The future land use percentages are based on planning documents of the County of Essex and City of Windsor (Updated Assessment Report, 2015).

Table 1-7: Projected Land Use in the Essex Region

Land Use Classification	Area km² (mi²)	Area (Acres)	Percent Coverage
Agriculture	1,252.3 (484)	309,449	74.5
Urban Areas	285.8 (110)	70,622	17.0
Natural Areas	142.9 (55)	35,311	8.5

Urban areas include residential, commercial, industrial, mixed, open & recreational; natural land areas include woodlots and wetlands.

Source: Essex Region Source Protection Area, Updated Assessment Report, March 2015.

2 Roles and Duties of Government Units and Water Supply Agencies

This section describes the roles and responsibilities of the governmental and water supply personnel as related to the SWP program. In general, the day-to-day communication between these personnel, businesses, and the general public will need to be open with clear lines of shared responsibility and notification to adequately protect GLWA surface water intakes. The contacts, affiliations and phone numbers are discussed below.

2.1 Great Lakes Water Authority

The GLWA operates and maintains the subject surface water intake and related water supply infrastructure. GLWA has developed this SWIPP and is the primary organization responsible for the implementation and periodic updating of the SWIPP. The GLWA Emergency Response Plan currently includes elements common to this SWIPP and is expected to be updated regularly with respect to surface water intake protection contingency measures. The Chief Executive Officer and Chief Operating Officer are responsible for all operational decisions

regarding source water, use warnings to wholesale customers, treatment, and distribution. Other GLWA staff under their direction may carry out the communications with customers or others during a surface water intake incident.

Suzanne Coffey, Interim Chief Executive Officer: 735 Randolph St. Detroit, Michigan 48226

Cheryl Porter, Chief Operating Officer (COO): 735 Randolph St. Detroit, Michigan 48226

Terry Daniel, Water Operations Director: 10100 E. Jefferson Ave. Detroit, Michigan 48214

2.2 Local Jurisdictions

Local government has the authority to declare a local state of emergency and commit resources to address emergency situations. As per the GLWA Emergency Response Plan, for large scale emergencies, disasters or planned events, the City of Detroit, Genesee, Lapeer, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne Counties may activate their Emergency Operations Plan (EOP) and open the Emergency Operations Center (EOC) within their jurisdiction. When this happens, the GLWA Chief Executive Officer (CEO) will report to or will send a Department representative to the activated EOC to serve as a subject matter expert during the event. Member Partners, including as DWSD, have retail customer notification responsibilities and are generally not actively involved in source water protection but are the government units which issue boil water advisories or public announcements regarding the water supply to their communities in an incident.

2.3 Surrounding Counties

Surrounding Counties which are in the Critical Assessment Zones and are at least partially within the GLWA service area include Lapeer, Macomb, Monroe, Oakland, St. Clair, and Wayne Counties. Each has several agencies that are potentially involved with the Surface Water Protection Plan, including the Sheriff's Office, County Health Departments, and County emergency preparedness/management departments. **Table 2-1** identifies the relevant County level departments for surrounding counties.

Table 2-1: County Level Governmental Departments Contacts

County	Sheriff's Office	Health Department	Emergency Preparedness/Management Department
Lapeer	(810) 664-1801	(810) 667-0392	(810) 667-0242
Macomb	(586) 469-5151	(586) 469-5235	(586) 469-5270
Monroe	(734) 240-7700	(734) 240-7800	(734) 240-3135
Oakland	(248) 858-5000	(248) 858-1280	(248) 858-5300
St. Clair	(810) 987-1700	(810) 987-5300	(810) 989-6965
Wayne	(313) 833-0864	(734) 727-7400	(734) 727-7030

2.4 United States Coast Guard

The United States Coast Guard (USCG) operates the National Response Center (NRC) which is the sole federal point of contact for reporting all hazardous substance releases and oil spills to the drainage system or surface

waters. The National Response Center (NRC) is a part of the federally established National Response System and staffed 24 hours a day by the U.S. Coast Guard. It is the designated federal point of contact for reporting all oil, chemical, radiological, biological and etiological discharges into the environment, anywhere in the United States and its territories. The NRC also takes maritime reports of suspicious activity and security breaches within the waters of the United States and its territories.

In the event of an incident, NRC notifies all stakeholders and a pre-designated federal on-scene coordinator, like the local USCG Incident Management Division, is notified and is responsible for directing the response. USCG District 9 is responsible for spill response in the Great Lakes and the Detroit River. USCG Sector Detroit's area of responsibility run from Tawas City south to Sandusky and include all three of GLWA's intakes.

Points of contact in the event of an incident are:
USCG Detroit Station: (313) 568-9525

National Response Center: (800) 424-8802

2.5 State of Michigan

The State of Michigan has the regulatory authority for the GLWA Water System through EGLE. In addition, the Michigan State Police (MSP) provides police and emergency support through the Emergency Management Division.

2.5.1 Michigan Department of Environment, Great Lakes, and Energy

The EGLE Drinking Water and Environmental Health Division regulates the GLWA Water System. The system falls within the service areas of EGLE's Jackson, Lansing, and Warren District Offices. District representatives include:

Jackson District Office (Monroe County): Sean Brown (517) 937-6799

Lansing District Office (Lapeer County): Kurt Swendsen (517) 525-1487

Warren District Office (Macomb, Oakland, St. Clair, and Wayne Counties): Kristina Donaldson (586) 753-3759

2.5.2 Pollution Emergency Alerting System (PEAS)

The Michigan Pollution Emergency Alerting System (PEAS) receives information about environmental incidents into EGLE. PEAS is alerted to incidents affecting air, land, water, wetlands, dams, and public drinking water supplies through a 24-hour toll-free hotline. PEAS also receives alerts generated by the NRC for redundancy. PEAS distributes incident information internally within EGLE as well as to other relevant state agencies as appropriate. The Michigan Health Alert Network (MIHAN) is a secure, web-based communication system that was established as a means to alert relevant parties of spills in a timelier manner. The MIHAN allows for a two-way, 24/7 flow of information between key points of contact from the State of Michigan, local public health agencies, and emergency management groups. Alerts are generated for potential releases, potential threats, and confirmed threats. For incidents related to surface water intakes, PEAS uses MIHAN to notify drinking water plant operators of reported releases of hazardous substances that might impact the plant's source water (EGLE, 2021). EGLE water quality staff and drinking water staff (Section 0) will be alerted and activated to provide technical assistance

to first responders and responsible parties as to appropriate responses to minimize environmental impacts and protect public health.

PEAS Hotline: (800) 292-4706

2.5.3 Michigan State Police

The Michigan State Police provide police and emergency services support. The local post is:

Metro North Post No. 21: (248) 584-5740

Post Commander: Lt. Kevonn Whitfield

Headquarters General Information: (517) 241-8000

2.6 Canada

The Ministry of the Environment, Conservation and Parks (MECP) administers committee-developed, risk-driven, watershed-based source protection plans analogous to this plan under Canada's 2006 Clean Water Act.

MECP Environmental Spills Action Center: (416) 325-3000 or Toll-Free at 1-800-268-6060

Sarnia MECP District: (519)-336-4030 or Toll-Free at 1-800-387-7784

3 Source Water Protection Areas

3.1 Source Water Area

The SWA associated with the Belle Isle Intake was delineated to identify the land and water upstream of the intake that has the potential to directly influence the quality of the source water at the intake. The boundaries of the SWA were established by the U.S. Geological Survey (USGS) through watershed(s) mapping efforts for the SWA (MDEQ, 1999). (Appendix A)

A general description of the SWA boundaries and watersheds, sub watersheds and drainage systems within the boundaries of the SWA tributary to the drinking source water of the Belle Isle Intake follows. County jurisdictions located within the SWA boundary are also presented.

3.1.1 Belle Isle Intake Source Water Area

The Belle Isle Intake SWA encompasses approximately 62,000 acres, including 25 miles of shoreline along the Detroit River and Lake St. Clair (

Figure 3-1 Belle Isle Intake Source Water Area). The SWA includes the Lake St. Clair Direct Drainage Sub watershed (LSCW). The majority of runoff from this sub watershed drains to Lake St. Clair directly through storm sewer pipes or drains.

The LSCW Management Plan for Wayne and Macomb Counties, 2006 indicates that 99% of the area within the sub watershed is served by sanitary or combined sewers. The sanitary and combined sewers in the sub watershed flow to the Detroit Water and Sewerage Department Wastewater Treatment Plant (WWTP). During wet weather, if allowable flow to the GLWA combined sewer overflow (CSO) system is exceeded, approximately 95% of the excess flows will be redirected to retention treatment facilities. The Connor Creek Retention Basin is the only GLWA CSO basin upstream of the Belle Isle Intake. If the capacity of the basin is exceeded, the overflow is screened and disinfected prior to discharge to Lake St. Clair.

The SWA includes a small area of Wayne County at its eastern boundary and a portion of southeast Macomb County (**Table 3-1**).

Table 3-1: County Drainage Area within SWA, Belle Isle Intake

County	Drainage Area within SWA (Acres)	Percent of Total SWA %
Macomb	40,300	65
Wayne	21,700	35
TOTAL SWA	**62,000**	**100%**

Figure 3-1 Belle Isle Intake Source Water Area

3.2 Critical Assessment Zones

The Critical Assessment Zone (CAZ) is a subarea within the SWA located immediately around the intake and identified as a zone of heightened concern for source water quality threats. The CAZ is a zone of vulnerability

where a significant contaminant threat within this area would afford little or no reaction time to implement remedial measures to prevent the contaminated source water from entering the intake system.

CAZs were established for each of the GLWA intakes under the SWA Report (Appendix A) in accordance with the Assessment Protocol for Great Lakes Sources. Depending on the source water body where the intake is located (lake or river), the CAZs are circular or semi-circular areas established around the center of the intakes. The radius of the CAZ is determined from the combination of two factors: the distance of the intake from shore and the average depth of the intake screens. The radius of the CAZ is determined based on the magnitude of the product of distance from shore and depth of the intake screens. If the radius of the CAZ is such that the CAZ perimeter intersects the shoreline, an inland buffer zone was created.

The buffer zone is similarly an area of heightened concern for contaminant threats to the source waters due to its proximity to the intake. Potential threats within the buffer zones may be from chemical or pathogen contaminants spilled or discharged to source waters. The width of the buffer zone is defined as the distance from the point that the CAZ intersects the shoreline to the edge of the CAZ. The CAZ and buffer zones were described as susceptible areas in the SWA report (Appendix A).

The CAZ and associated buffer zones established for the Belle Isle Intake in the SWA report (Appendix A) are presented in the sections below.

3.2.1 Belle Isle Intake Critical Assessment Zone

The CAZ determined for the Belle Isle Intake in the SWA Report (Appendix A) is a semi-circular area having a 3,000-ft radius. The radius is centered on the floating booms at the mouth of the intake lagoon (**Figure 3-2**). A buffer zone having a width of 1,375 feet was established along the shoreline within the SWA boundary.

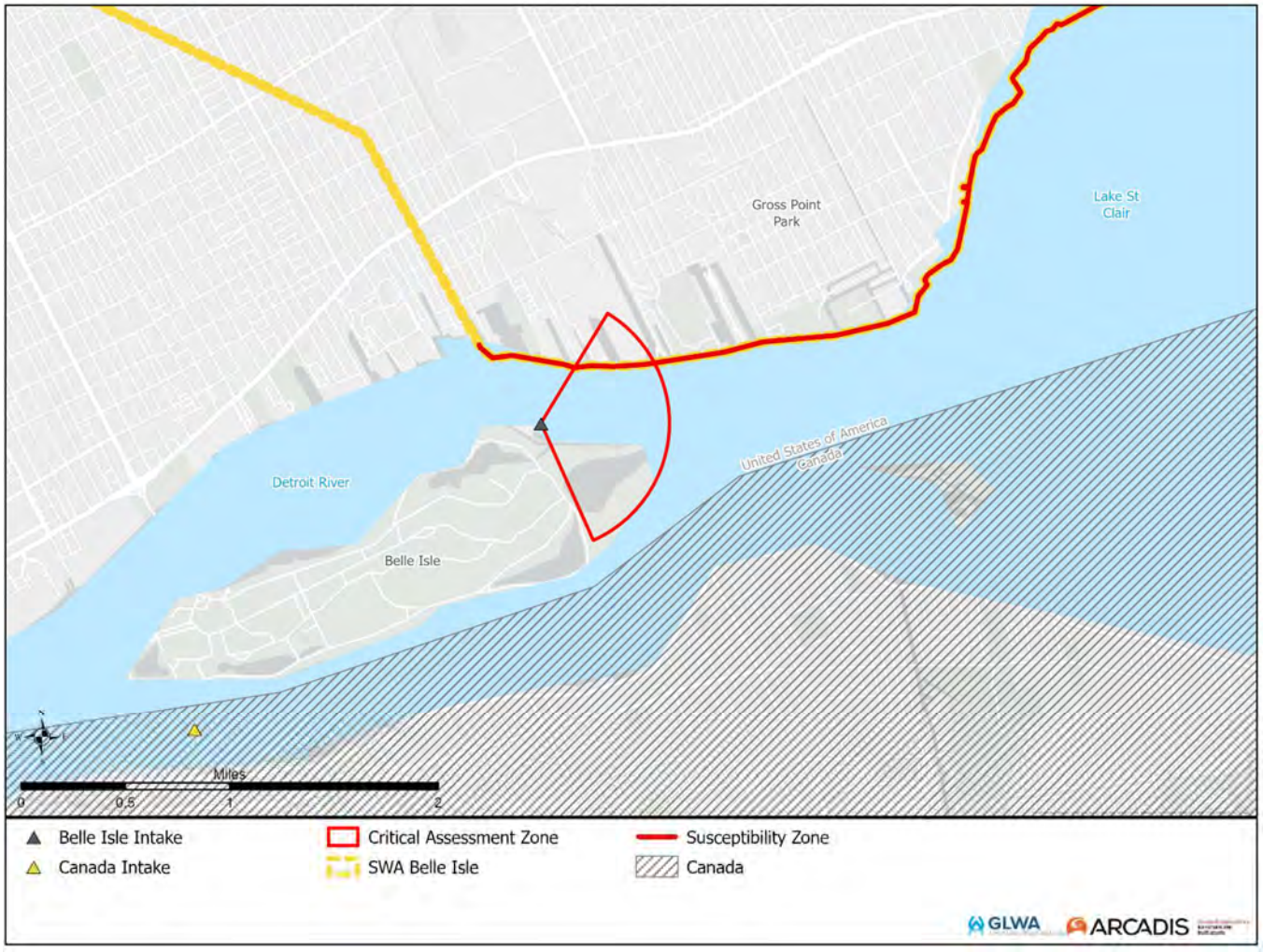

Figure 3-2 Belle Isle Intake Critical Assessment Zone

3.3 Potential Sources of Contamination

A potential contaminant source is a location where there is land use or associated land use activity having potential to release contaminants into the environment at a concentration able to influence drinking water source quality. Identifying potential sources of contamination and the magnitude of these threats is an initial step in source water protection.

Within the source water area of the Belle Isle Intake, the potential sources of contamination to the drinking water supply can be attributed to a number of point and non-point pollutant sources. These land-based contaminant sources may result from land-use activities including sewage treatment plant effluent discharge, industrial facility discharge, solid waste sites, national priority list sites, and land application of pesticide or fertilizers. They can also be attributed to commercial and industrial activities that involve the use, transport, storage or manufacture of hazardous materials that have the potential to spill or leak, contributing to surface or groundwater pollution. In addition to threats from contaminants that originate inland, the Belle Isle Intake is also vulnerable to spills that may occur on waterways in proximity to the intakes or due to spills or discharges from shipping vessels. These

and other land and water-based activities have the potential to adversely impact the source water quality, particularly those activities within the source water areas located near the water intake.

The investigation of potential contaminant sources within the source water areas of the Belle Isle Intake included review of regulatory databases, Source Water Protection Plan for Essex Region, Ontario, Canada, shipping traffic cargo data and hazardous liquid river crossings for the Detroit and St. Clair Rivers. The following sections discuss potential contaminant source inventories compiled and examined for the Belle Isle Intake.

3.3.1 Potential Contaminant Source Inventory, Regulatory Database Search

A review of regulatory databases was completed to identify existing chemical and pathogen land-use activities within the SWA. These database sources provided information on locations of potential chemical spills and pathogen discharge and included inventory of those entities involved with the handing, storage, generation, transport, and disposal of toxic or hazardous materials. **Table 3-2** provides a summary of the various regulatory databases investigated, including identification of the responsible agency and description of the activity monitored. The identification of a site does not necessarily mean the business, industry or operation is out of compliance with local, state or federal regulations and does not mean that a business or industry will cause contamination.

Table 3-2: Regulatory Database Search for Potential Sources of Contamination

Regulatory Database	Agency	Description
Federal National Priority List (Superfund)[1]	United States Environmental Protection Agency (USEPA) Region 5	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also known as Superfund) is a program administered by the USEPA to locate, investigate, and clean up the most contaminated hazardous waste sites throughout the United States. In some cases, hazardous wastes at these sites seeped into the ground, flowed into rivers and lakes, and contaminated soil and groundwater. Superfund sites include properties such as abandoned warehouses, manufacturing facilities, processing plants, and landfills.
Hazardous Waste Treatment, Storage and Disposal Facilities Part 111, Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451[1]	EGLE, Waste and Materials Handling Division	Hazardous waste information is contained in the Resource Conservation and Recovery Act Information (RCRAInfo), a national program management and inventory system about hazardous waste handlers. In general, all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies.

Regulatory Database	Agency	Description
Underground Storage Tanks (Active) Part 211, NREPA, 1994 PA 451[2]	Department of Licensing and Regulatory Affairs (LARA)	This program includes regulatory activities and oversight of the design, construction, installation and maintenance of regulated tanks.
Leaking Underground Storage Tank System Releases Part 213, NREPA, 1994 PA 451[2]	EGLE Remediation and Redevelopment Division (RRD)	This program is responsible for active Leaking Underground Storage Tank System Releases and oversees corrective actions, auditing, assessments and associated reports.
Environmental Remediation Part 201, NREPA, 1994 PA 451[2]	EGLE RRD	The Environmental Remediation program covers releases of hazardous substances from a variety of sources (i.e., commercial and industrial processes, above ground storage tanks, environmental emergencies, etc.).
Toxic Release Inventory (TRI)[3]	EGLE, Superfund Amendments and Reauthorization Act (SARA) Title III	TRI collects information to track certain industries manufacturing and management of specified toxic materials and waste generation. When providing this information, many facilities choose to describe the measures they have taken to prevent pollution and reduce the amount of toxic chemicals entering the environment. As a result, TRI serves as a tool for identifying effective environmental practices and highlighting pollution prevention successes.
National Pollutant Discharge Elimination System (NPDES) Permits[1]	EGLE	The NPDES addresses water pollution by regulating point sources that discharge pollutants to waters of the United States.
Toxic Substances Control Act (TSCA) of 1976[1,4]	USEPA Office of Chemical Safety and Pollution Prevention	TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos, radon, and lead-based paint.
Michigan PFAS Action Response Team (MPART) Investigations, PFAS Sites[5]	EGLE, MPART	MPART was created to address the threat of per- and polyfluoroalkyl substance (PFAS) contamination in Michigan, protect public health, and ensure the safety of Michigan's land, air, and water.

1. EPA Office of Information Collection, Facility Registry System - www.epa.gov/enviro/html/fii/prog_sys.html
2. EGLE, Licensing and Regulatory Affairs (LARA) Remediation Information Data Exchange https://www.egle.state.mi.us/RIDE/ Data accessed January 2021.
3. EPA Toxics Release Inventory Program - http://www2.epa.gov/toxics-release-inventory-tri-program

Regulatory Database	Agency	Description
4. EPA TSCA Chemical Substance Inventory - https://www.epa.gov/tsca-inventory 5. EGLE Michigan PFAS Action Response Team - https://www.michigan.gov/pfasresponse/		

3.3.2 Potential Contaminant Source Inventory, Essex Region

Due to the proximity of the Belle Isle Intake on the Detroit River to the Essex Region of Ontario, Canada, the investigation of potential contaminant threats to drinking source water was extended to watersheds within Canada that are tributary to Lake St. Clair and the Detroit River. The Essex Region Conservation Authority, Ontario MECP, and various regional stakeholders completed the *Essex Region Source Protection Area Plan (ERSPA)* in 2015 as part of a source water protection planning process to ensure the quality and sustainability of regional municipal drinking water supplies. Some updates to the report, including some charts and figures, were included with updates published in 2019 (Essex Region Conservation Authority, 2019).

The ERSPA sets out a risk-based process to identify vulnerable areas and associated source water threats and issues. The risk assessment process included an effort to address the likelihood of surface water becoming polluted in areas around municipal drinking water intakes. The Essex Region includes two municipal water treatment plant intakes located on Lake St. Clair (Stoney Point and Lakeshore) and two municipal water intakes on the Detroit River (A.H. Weeks and Amherstburg). Given the proximity of these intakes with the two GLWA intakes located on the Detroit River, they all share common interest for the quality of the drinking water source in the Detroit River and Lake St. Clair. The drinking source water threats identified by the ERSPA for the Essex Region intakes were reviewed for their potential to influence on the drinking source water for the Belle Isle Intake on the Detroit River.

The ERSPA – Water Quality Risk Assessment examined existing water quality issues in source waters and identified and described threats from land uses or activities that have the potential to influence drinking water sources. The purpose of the assessment was to differentiate those threats perceived as significant threats from those that posed moderate or low risks. This assessment began with identification of vulnerable areas around municipal intakes (Intake Protection Zones). Intake Protection Zones (IPZ) were defined as areas of land and water, where runoff from streams and or drainage systems, in conjunction with currents in lake and rivers, could directly impact the source water at the municipal drinking water intakes. Within the IPZ areas special care must be taken in the use and handling of chemicals and other potential contaminants. Based on the proximity to the intake three IPZ vulnerability areas were established.

- **IPZ-1** – Area immediately around the intake crib. Circle of semi-circle 1 km radius centered on the intake crib. If the boundary extends onto land, a setback up to 120 meters is established from high water mark where overland flow drains into surface water body.
- **IPZ-2** – Extends outside IPZ-1. This area accounts for the influence of nearby watersheds, where pollutant runoff may pick up pollutants and affect water quality in near-shore waters at municipal intakes. IPZ-2 generally encompasses area within a few kilometers of the intakes based on a two-hour time of travel for flow of water along the shores and in the tributary watersheds.
- **IPZ-3** – Extends outward from IPZ-2. Covers a larger watershed area generally within 24-hour time of travel. IPZ-3 includes all rivers and tributaries where modeling demonstrates that a contaminant spill may reach the

intake during an extreme rainfall or windstorm event. IPZ-3 delineated based on model simulation of tanker truck fuel spills in the headwaters of selected tributaries and fuel storage facilities at various locations.

Figure 3-3: Intake Protection Zones for Essex Region Lakeshore WTP Intake provides an illustration identifying the IPZ areas for the Lakeshore WTP located in Lake St. Clair. A vulnerability score was determined for each intake IPZ. The vulnerability score was based on a scale of 1 to 10 (10 being the most vulnerable). This score was derived based on a number of factors, including intensity of tributary land use; depth of the water at the intake; and water quality issues.

The IPZ-1 and IPZ-2 vulnerability scores for the Essex Region intakes on the Detroit River were higher due to consideration of urban land use in the City of Windsor and surrounding areas. **Table 3-3** presents vulnerability scores for IPZs.

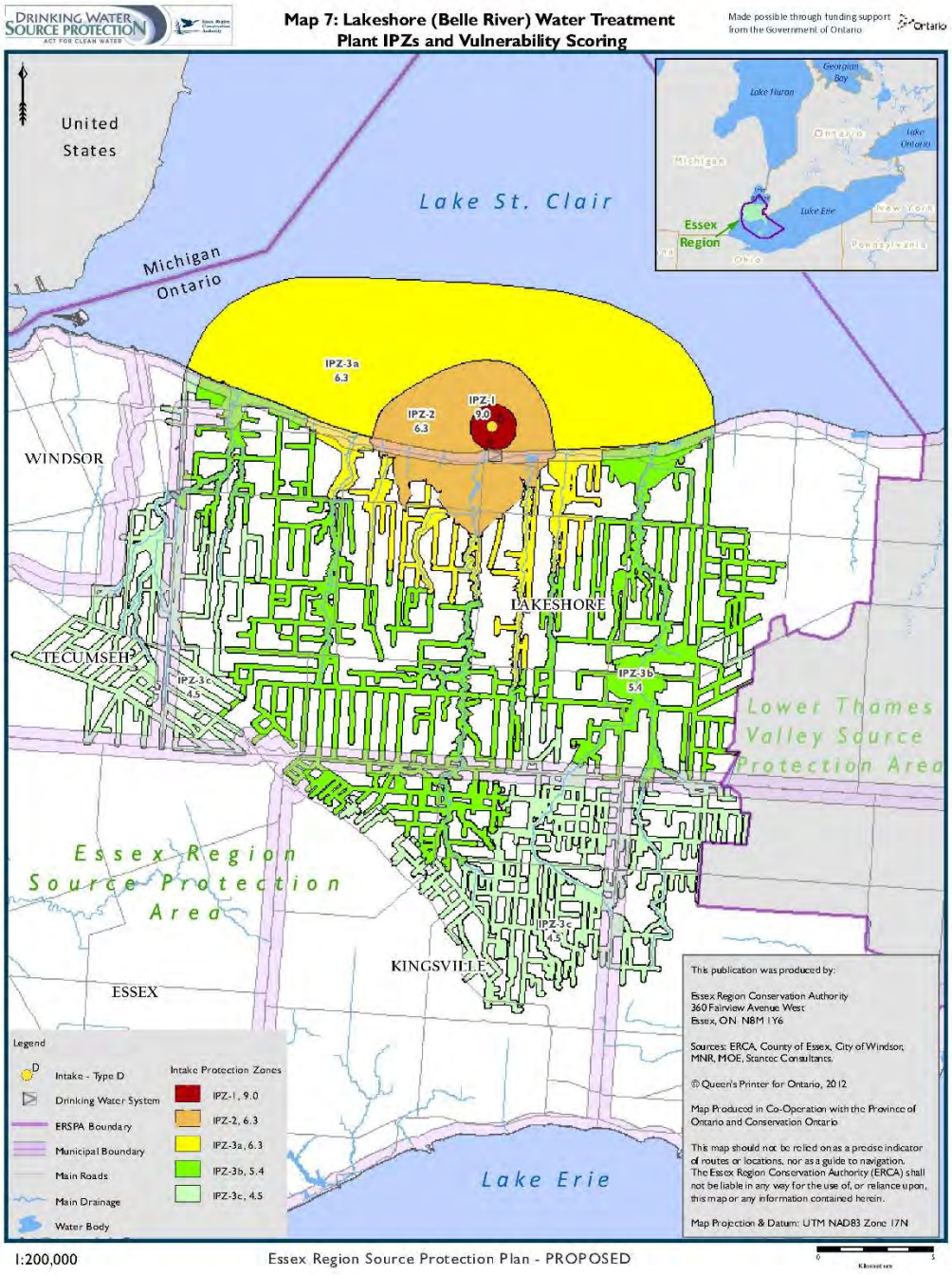

Figure 3-3: Intake Protection Zones for Essex Region Lakeshore WTP Intake
Source: Essex Region Source Protection Area, Updated Assessment Report, 2019

Table 3-3: IPZ – Vulnerability Score Lake St. Clair and Detroit River Intakes

WTP Intake	Location	IPZ – 1	IPZ – 2	IPZ – 3
Stoney Point	Lake St. Clair	9	6.3	4.5 – 6.3
Lakeshore	Lake St. Clair	9	6.3	4.5 – 6.3
A. H. Weeks	Detroit River	9	8.1	N/A[1]
Amherstburg	Detroit River	9	7.2	N/A[1]

Notes:

1. Vulnerability scores not applicable to IPZ-3 for intakes on Detroit River connecting channel.

Source: Essex Region Source Protection Area, Updated Assessment Report, 2019 (Essex Region Conservation Authority, 2019)

Drinking water quality threats were prescribed by the MECP as significant, moderate, or low threats in IPZ vulnerable areas. The following approaches inform GLWA's potential contaminant source inventory:

1. Drinking Water Threats-Based Approach
2. Events-Based Modelling Approach, and

The identification of a threat does not necessarily indicate that the threat exists within an IPZ. The MECP identified potential contaminant sources in an effort to develop management strategies which could be implemented for future land use activities in the watershed.

3.3.3 Drinking Water Threats-Based Approach

Through the threats-based approach, issues are identified as significant, moderate or low in vulnerable areas. The MECP defined a threat to the drinking source water as a chemical or pathogen that poses a risk to the drinking water source. The MECP developed a list of hundreds of potential chemical and pathogen threats that fall under the following 19 general prescribed categories of drinking water quality threats:

1. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
2. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.
3. The application of agricultural source material to land.
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer.
9. The handling and storage of a commercial fertilizer.
10. The application of a pesticide.
11. The handling and storage of a commercial pesticide.
12. The application of road salt.

13. The handling and storage of road salt.
14. The storage of snow.
15. The handling and storage of fuel.
16. The handling and storage of dense non-aqueous phase liquids (DNAPL).
17. The handling and storage of organic solvent.
18. The management of runoff that contains chemicals used in the de-icing of aircraft.
19. The use of land as livestock grazing or pasturing land, and outdoor confinement area or a farm-animal yard.

The potential threats were given a hazard rating based on a scale of 1 to 10, with 10 being the most dangerous. A risk score was then computed as the product of the vulnerability score of the IPZs and the hazard rating of the threat to provide a score out of 100. The risk score is then put into one of three categories: low, moderate or significant as shown in **Table 3-4**.

Table 3-4: Threat Levels Based on Risk Score

Threat	Risk Score
Significant	80 – 100
Moderate	60 – 79
Low	40 - 59

Through the threats-based approach, threats can only be significant in areas with a high vulnerability score. The areas where significant threats are considered are IPZ-1 of Stoney Point, Lakeshore, A.H. Weeks, and Amherstburg which have a vulnerability score of 9.0 or IPZ-2 of A.H. Weeks with a vulnerability score of 8,1.

Table 3-5 presents those potential drinking water threats calculated to be significant within the IPZ-1 protection zone of the A.H. Weeks WTP (Windsor). It is important to note that the drinking water threats rating (Significant Moderate, Low) is based on the IPZ vulnerability score and hazard rating for a prescribed drinking water threat. These threats do not necessarily exist in the subject IPZ, but would be deemed as Significant, Moderate or Low if they did exist.

Table 3-5: List of Prescribed Potential Drinking Water Threats Based on Vulnerability Score of 9.0 for IPZ-1 for the A.H. Weeks (Windsor) WTP

No.	Prescribed Drinking Water Threats	SIG	MOD	LOW
1	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	X	X	X
2	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	X	X	X
3	Application of agricultural source material to land.	X	X	X
4	Storage of agricultural source material.	X	X	X

No.	Prescribed Drinking Water Threats	SIG	MOD	LOW
5	Management of agricultural source material.	X	X	X
6	Application of non-agricultural source material to land.	X	X	X
7	Handling and storage of non-agricultural source material.	X	X	X
8	Application of commercial fertilizer.	X	X	X
9	Handling and storage of a commercial fertilizer.	X	X	X
10	Application of a pesticide.	X	X	X
11	Handling and storage of a commercial pesticide.	X	X	X
12	Application of road salt.	X	X	X
13	Handling and storage of road salt.	X	X	X
14	Storage of snow.	X	X	X
15	Handling and storage of fuel.		X	X
16	Handling and storage of non-aqueous dense phase liquids (DNAPL).		X	
17	Handling and storage of organic solvent.		X	X
18	Management of runoff that contains chemicals used in the de-icing of aircraft.	X	X	X
19	Use of land as livestock grazing or pasturing land, and outdoor confinement area or farm animal yard	X	X	
Note: Types of potential drinking water threats are based on vulnerability scores and the MECP's Tables of Drinking Water Threats and do not necessarily exist in the subject IPZs, but would be deemed as significant, moderate, or low threats if they were to exist.				

Source: Essex Region Source Protection Area, Updated Assessment Report, 2019 (Essex Region Conservation Authority, 2019)

3.3.3.1 Events-Based Approach

Through the events-based approach, an activity is a significant drinking water threat in IPZ-1, IPZ-2 or IPZ-3 if modeling demonstrates that a release of a contaminant from the activity would result in deterioration of the source drinking water quality. Modeling of fuel spills at various locations demonstrated exceedance of minimum water quality standards at intakes in Lake St. Clair and the Detroit River.

3.3.4 Potential Contaminant Source Inventory, Shipping and Recreational Boating Traffic

Shipping and recreational boating traffic on Lake St. Clair or the Detroit River pose a risk to the drinking source water at the Belle Isle Intake as a result of potential spills, or discharge of ballast water or grey water to the source water. To determine the potential risk that spills from shipping traffic present to the source water, shipping traffic

records were examined to determine the quantity of hazardous or toxic material cargo shipped on the Great Lakes and connecting channels in proximity to the Belle Isle Intake.

Waterborne commerce statistics are reported by the U.S. Army Corps of Engineers in the publication Waterborne Commerce of the United States (WCUS), which provides statistics on the foreign and domestic waterborne commerce moved on the United States waters. Two of the commodities tracked by the WCUS, are Petroleum and Petroleum Products and Chemicals and Related Products.

The Petroleum and Petroleum Products commodity category includes gasoline, distillate fuel oil, residual fuel oil, petroleum coke, naphtha and solvents, asphalt tar and pitch. The Chemical and Related Products commodity category includes fertilizers, benzene and toluene, metallic salts and pesticides. A comprehensive listing of all petroleum and chemical products under the Petroleum and Petroleum Products and Chemical and Related Products categories can be found in the tables of Appendix B.

Table 3-6 and **Table 3-7** summarize shipping traffic cargo related to Petroleum and Petroleum Products/Chemicals and Chemical Related Products on Lake St. Clair and the Detroit River in proximity of the Belle Isle Intake during the calendar years 2016 through 2019. Several of the significant potential contaminants in terms of quantity shipped and hazardous/toxic characteristics include gasoline, distillate and residual fuel oils, fertilizers and metallic salts.

Table 3-6: Summary of Foreign and Domestic Shipping Traffic, Lake St. Clair CY 2016 - 2019

Commodity Category	CY2016 (tons)	CY2017 (tons)	CY0218 (tons)	CY2019 (tons)
Petroleum and Petroleum Products	929,941	859,408	884,311	918,093
Chemical Products (fertilizers)	105,295	46,867	50,472	21,890
Other Chemical Products	190,745	132,323	174,998	65,289

Source: U.S. Army Corps of Engineers – Waterborne Commerce of the United States

Table 3-7: Summary of Foreign and Domestic Shipping Traffic, Detroit River CY 2016 - 2019

Commodity Category	CY2016 (tons)	CY2017 (tons)	CY0218 (tons)	CY2019 (tons)
Petroleum and Petroleum Products	1,334,185	1,288,950	1,276,471	1,324,095
Chemical Products (fertilizers)	105,295	46,867	50,472	21,890
Other Chemical Products	190,745	132,323	174,998	90,009

Source: U.S. Army Corps of Engineers – Waterborne Commerce of the United States

3.3.5 Potential Contaminant Source Inventory, Hazardous Liquid Pipeline River Crossings

Pipelines conveying hazardous liquids under pressure across the St. Clair and Detroit River bottoms potentially pose risks to the source water quality if a catastrophic failure were to occur. The U.S. Department of Transportation – Pipeline and Hazardous Materials Safety Administration (PHMSA) maintains the National Pipeline Mapping System (NPMS), which is a dataset containing locations of and information about gas transmission and hazardous liquid pipelines under the jurisdiction of the PHMSA. This dataset was reviewed to determine general locations of pipeline river crossings. There are a number of active river pipeline crossings that convey natural gas and liquefied petroleum gas (butane, propane) however, active crude oil lines pose a more significant potential threat to source water quality. The closest upstream river pipeline crossings with the potential to impact the source water at the Belle Isle Intake are located on the St. Clair River. The pipeline crossing locations on the St. Clair River are shown on

Figure 3-4 St. Clair River Pipeline Crossings

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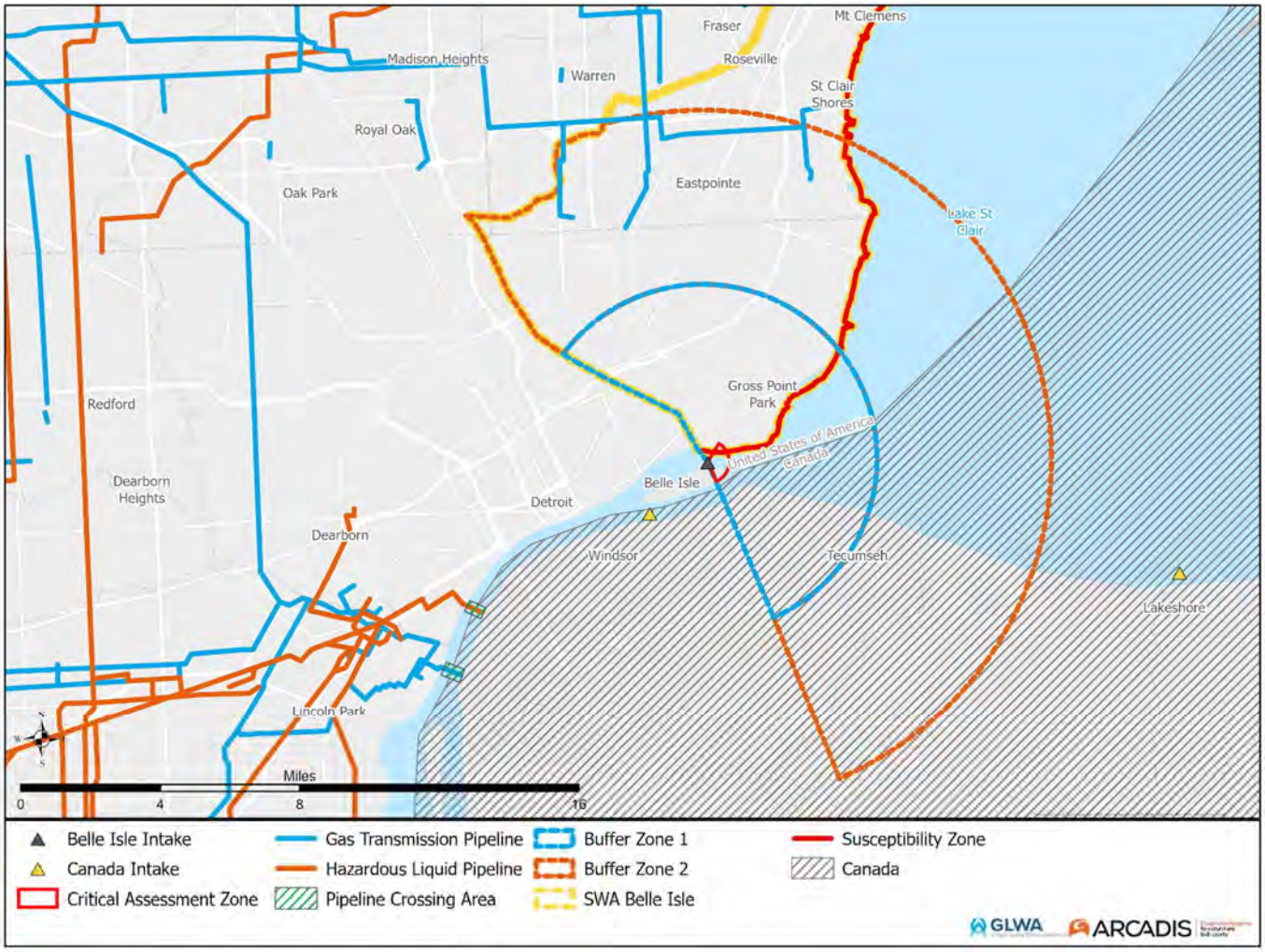


Source: Pipeline and Hazardous Materials Safety Administration National Pipeline Mapping System, 2021

Figure 3-4 St. Clair River Pipeline Crossings

3.3.6 Potential Contaminant Source Inventory, Belle Isle Intake SWA

The following provides a summary of the findings related to potential contaminant sources in the Belle Isle Intake source water area determined from review of regulatory databases, source protection planning documents Essex Region, Ontario, Canada and shipping vessel cargo records for the Detroit River and Lake St. Clair.

3.3.6.1 Regulatory Database Search

Table 3-8 provides a summary of results pertaining to the regulatory database search for potential contaminant sources in the source water area.

Table 3-8: Summary of Potential Contaminant Sources Belle Isle Intake SWA (data retrieved January 2021)

Item	Potential Contaminant Source Inventory
National Priorities List (Superfund)	0
Part 111, NREPA, 1994 PA 451 Hazardous Waste Treatment, Storage, and Disposal Facilities	1,642
Part 211, NREPA, 1994 PA 451 Underground Storage Tanks (Active)	1,009
Part 213, NREPA, 1994 PA-451 Leaking Underground Storage Tank System Release	731
Part 201, NREPA, 1994 PA 451 Environmental Remediation	355
TRI	87
NPDES Permits	65
TSCA of 1976	17
MPART PFAS Sites	1
GLWA PFAS Sites	6

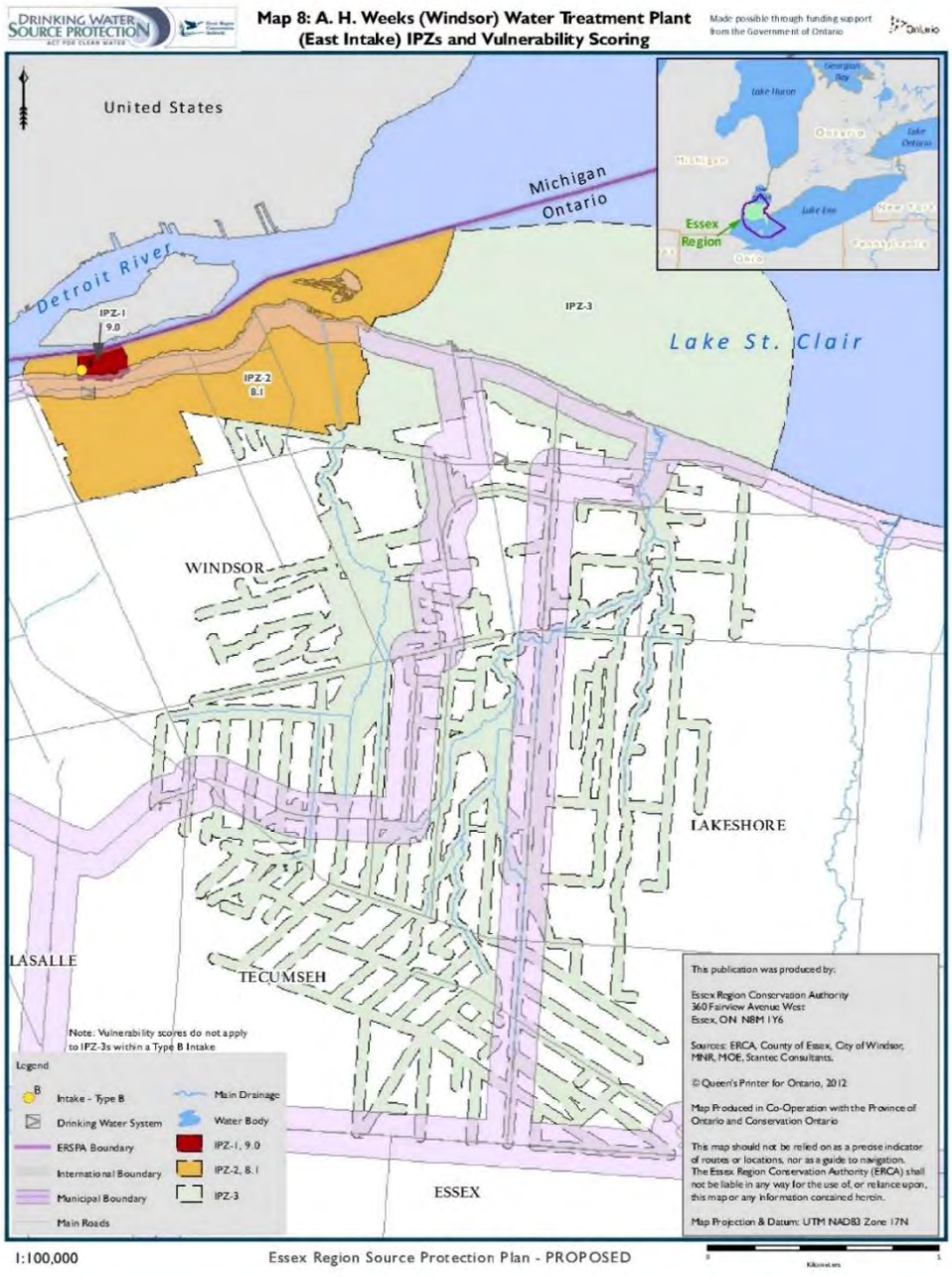
The distribution of these potential contaminant sources within the source water area is illustrated on the figures of Appendix C.

3.3.6.2 Potential Contaminant Sources from Canadian Watersheds

The ambient currents of the Detroit River will work against potential contaminants originating in Canadian watersheds from crossing the Detroit River to reach the source water at the Belle Isle Intake. The conditions that may allow contaminants from Canadian waters to reach the U.S. shore at the Belle Isle Intake would be an extreme wind or storm event that disperses contaminants from Canadian waters across the Detroit River to the Belle Isle Intake source water. In the case of an extreme weather event, it is expected that contaminants released to the Detroit River in closest proximity to the intake would have the highest likelihood of reaching the source waters in concentrations high enough to degrade the source water quality. Consequently, the contaminant source investigation focused on potential sources located in the watershed directly across the Detroit River.

Under the Essex Region Source Water Area Protection Plan (ERSWA), the A.H. Weeks WTP Intake was evaluated for vulnerability to water and land-based contaminant threats. **Figure 3-5** A.H. Weeks WTP Intake (East) Protection Zones

shows the location of the intake on the Detroit River and the individual IPZs established around the intake. Under the ERSWA, the MECP identified potential contaminant threats for each IPZ area. Due to the proximity of Belle Isle Intake to the IPZ-2 and IPZ-3 areas, significant contaminant sources in these IPZ areas were investigated as potential contamination threats under extreme weather circumstances to affect the source water at the Belle Isle Intake.



Source: Essex Region Source Protection Area, Updated Assessment Report, 2019
Figure 3-5 A.H. Weeks WTP Intake (East) Protection Zones

Table 3-9 shows the potential significant drinking water threats in the for the IPZ-2 area. The boundary of the IPZ-2 area is based on modeling of the extent of a two-hour time of travel.

These sources of significant drinking water threats in IPZ-2 do not necessarily exist currently in the IPZ -2.

Table 3-9: List of Prescribed Potential Drinking Water Threats IPZ-2 Based on Vulnerability Score of 8.1 for A.H. Weeks (Windsor) WTP (East and West Intakes)

No.	Prescribed Drinking Water Threats	SIG	MOD	LOW
1	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	X	X	X
2	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act.	X	X	X
3	Application of agricultural source material to land.	X	X	X
4	Storage of agricultural source material.	X	X	X
5	Management of agricultural source material.			X
6	Application of non-agricultural source material to land.	X	X	X
7	Handling and storage of non-agricultural source material.	X	X	X
8	Application of commercial fertilizer.		X	X
9	Handling and storage of a commercial fertilizer.		X	X
10	Application of a pesticide.	X	X	X
11	Handling and storage of a commercial pesticide.		X	X
12	Application of road salt.		X	X
13	Handling and storage of road salt.		X	X
14	Storage of snow.		X	X
15	Handling and storage of fuel.		X	X
16	Handling and storage of non-aqueous dense phase liquids (DNAPL).		X	X
17	Handling and storage of organic solvent.		X	X
18	Management of runoff that contains chemicals used in the de-icing of aircraft.		X	X
19	Use of land as livestock grazing or pasturing land, and outdoor confinement area or farm animal yard	X	X	

No.	Prescribed Drinking Water Threats	SIG	MOD	LOW
Note: Types of potential drinking water threats are based on vulnerability scores and the MECP's Tables of Drinking Water Threats and do not necessarily exist in the subject IPZs, but would be deemed as significant, moderate, or low threats if they were to exist.				

Source: Essex Region Source Protection Area, Updated Assessment Report, 2019

Based on **Table 3-9**, the drinking water threats for the IPZ-2 area are potentially related to pathogen threats from waste disposal sites or wastewater treatment systems, or to application, handling, storage or transfer of non-agricultural source material to agricultural land.

The contaminant threats associated with the IPZ-3 area were determined through events-based modeling, which demonstrated the release of a chemical parameter or pathogen from an activity during an extreme event would be transported to the intake and result in deterioration of the water for use a drinking water source in IPZ-3. Modeling simulated conditions of a fuel tanker truck spill upstream on a tributary in the watershed (volume 34,000L, @ 2% benzene content fuel) and fuel spill at a fixed industrial site in the watershed. The modeling effort demonstrated exceedance of maximum allowable concentration for benzene (0.005 mg/l) at the IPZ-3. This circumstance was determined to pose a significant threat to source water in IPZ-3.

Existing drinking source water issues at the A.H. Weeks Intake include elevated concentrations of aluminum, turbidity, and organic nitrogen that are considered drinking water quality issues at the intake. These issues are believed to be from both anthropogenic and natural sources.

3.3.6.3 PFAS Site Inventory

PFAS are a class of compounds suspected to adversely affect human health. The USEPA has established a lifetime health advisory limit for the sum of two known compounds, Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) of 70 parts per trillion (ppt). Additionally, the State of Michigan promulgated maximum contaminant levels for seven PFAS compounds in 2020 and mandated sampling for all drinking water sources (EGLE, 2020). PFAS compounds are found in a wide variety of consumer products as well as aqueous firefighting foam. As such, the compounds are often found at industrial sites, military compounds, and firefighting training facilities including airports and refineries. In response to the discovery of several PFAS contaminated sites throughout Michigan, the state created the MPART and created a database of sites with known PFAS contamination and those under investigation.

GLWA is an active participant in ongoing and planned research related to PFAS occurrence, fate and distribution in Water Resource Recovery Facilities (WRRF) and has instituted an Industrial Pre-treatment Program (IPP) PFAS initiative to develop means for initial screening, monitoring, probable source monitoring, sampling and analysis protocol as well as source reduction. In addition, GLWA's most recent NPDES permit requires quarterly monitoring and reporting of PFAS in the wastewater effluent. Sources of PFAS are identified, classified as "Potential" or "Significant", and tracked by GLWA.

The MPART and GLWA databases were reviewed and

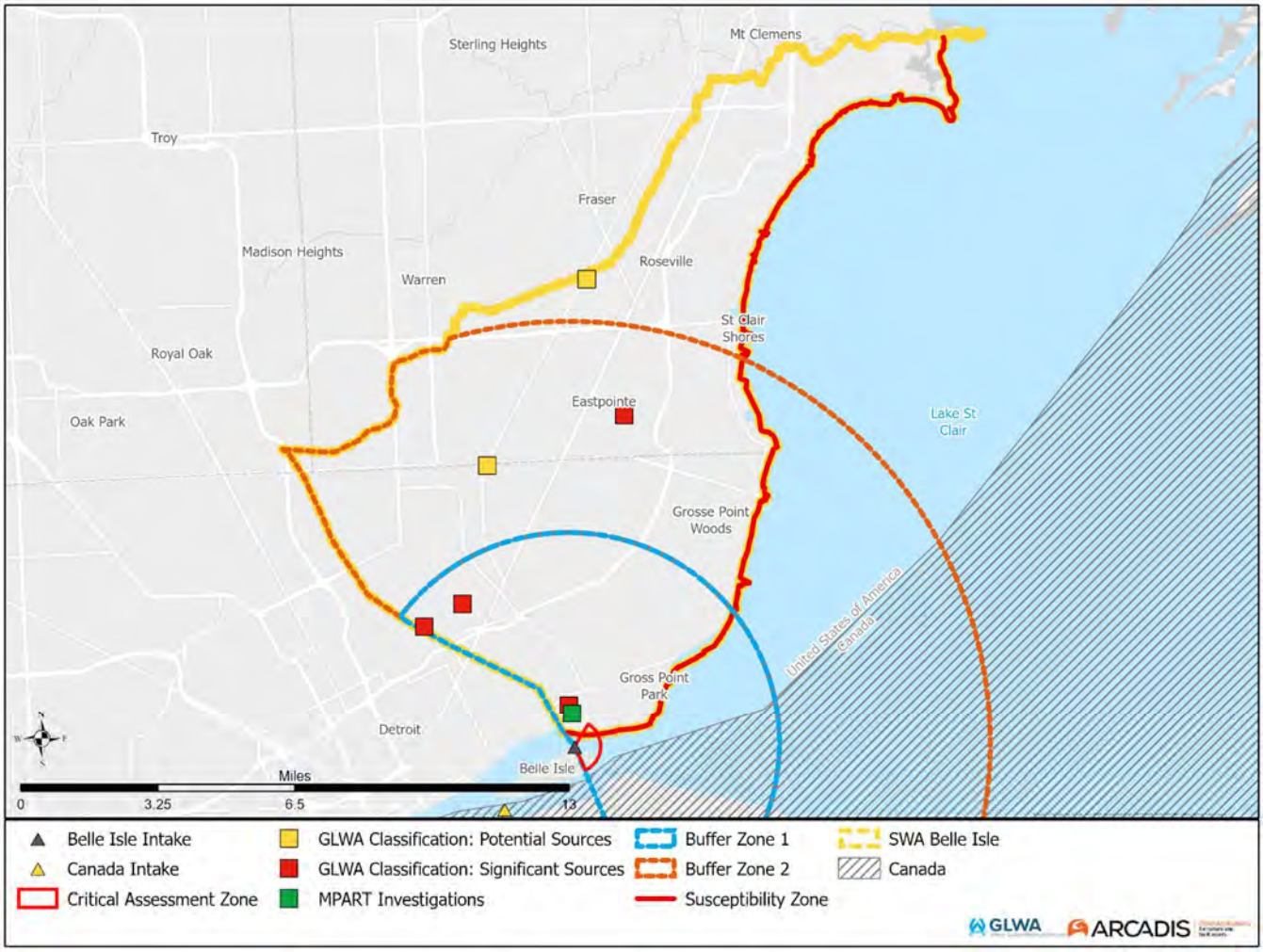


Figure 3-6 PFAS Sites within the Belle Isle Intake SWA

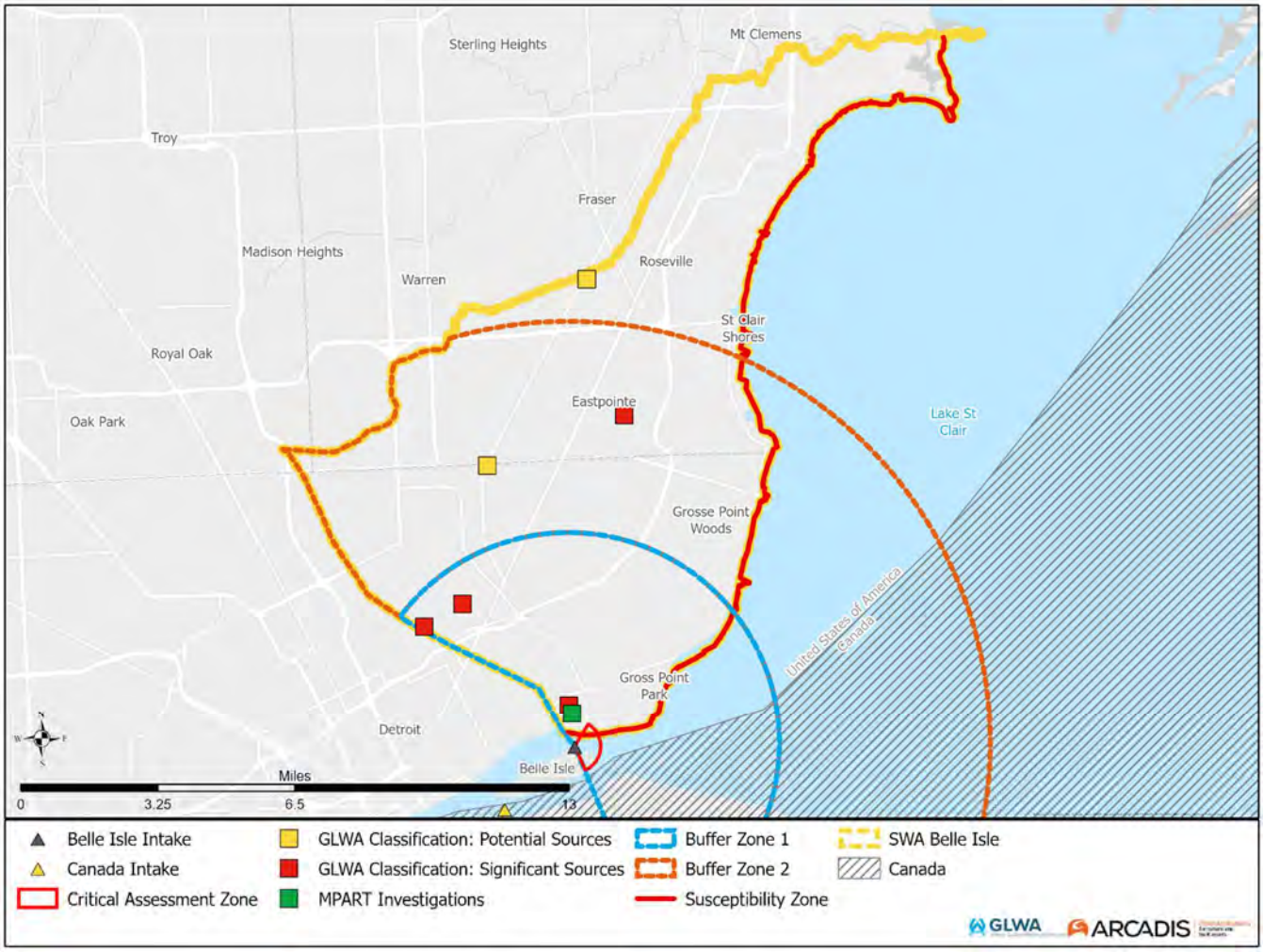


Figure 3-6 PFAS Sites within the Belle Isle Intake SWA depicts the PFAS sites within the Belle Isle Intake SWA. The full list of sites is included in Appendix C.

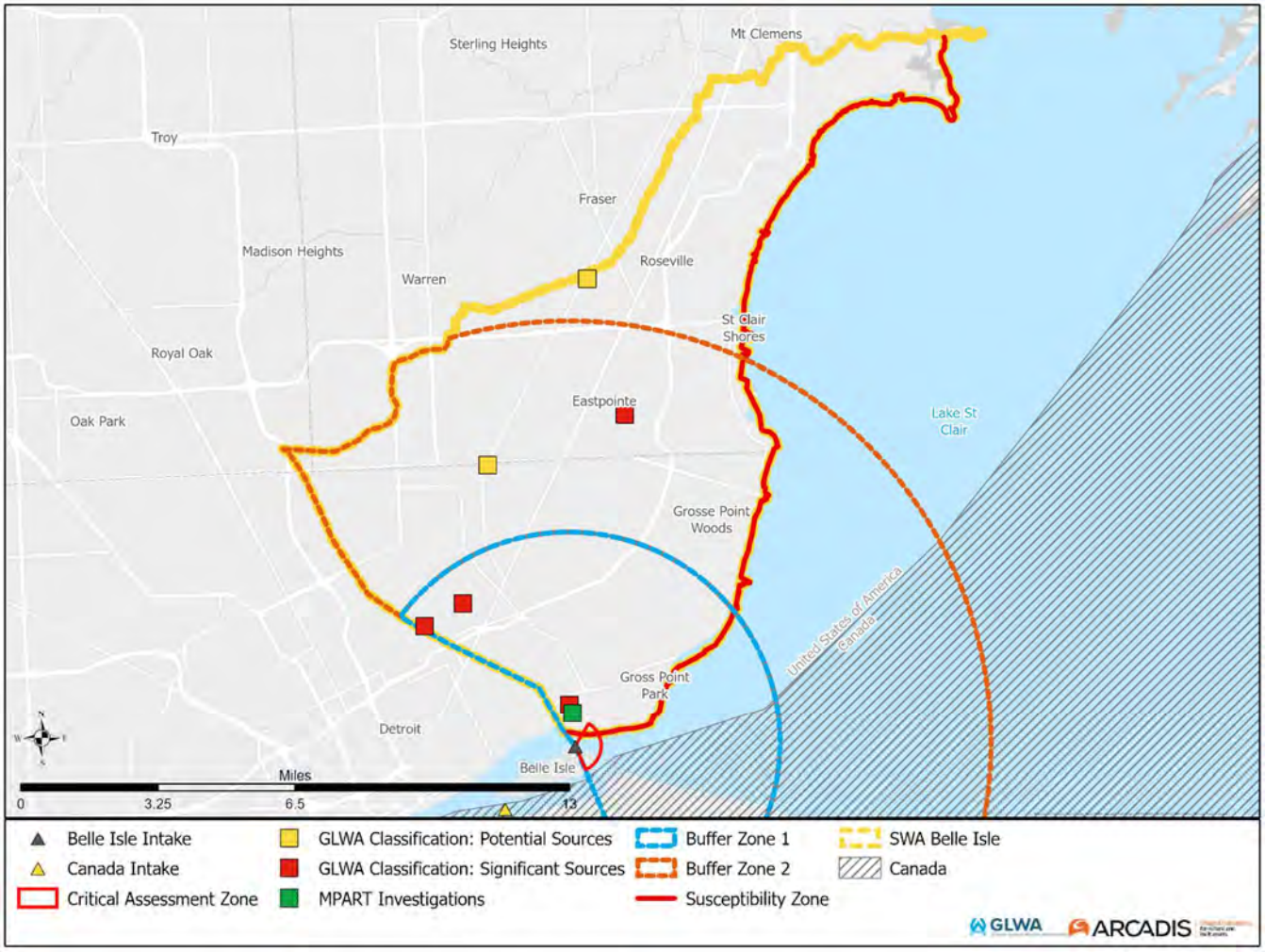


Figure 3-6 PFAS Sites within the Belle Isle Intake SWA

GLWA has conducted sampling for PFAS compounds at the Belle Isle Intake starting with the third Unregulated Contaminants Monitoring Rule (UCMR 3), starting in 2012. GLWA has continued to monitor for PFAS compounds at its intakes and plans to participate in UCMR 5, which is scheduled to occur between 2022 and 2026 and will include monitoring of 29 PFAS compounds (USEPA 2021). To date, no PFAS compounds have been detected in any GLWA raw water samples.

3.3.7 Potential Contaminant Source Inventory, Non-Point Source Pollution

The SWA includes the Lake St. Clair Direct Drainage sub watershed (LSCW). The majority of runoff from this sub watershed drains to Lake St. Clair directly through storm sewer pipes or drains. The sewers constructed in the nineteenth century to serve the city of Detroit combined sanitary and stormwater flow and discharged the untreated wastewater directly to the Detroit River. In 1912, the Fairview sewer was constructed to divert sanitary flows downstream of the Belle Isle Intake to avoid contamination of the drinking water source. Additional sewer work was completed in 1930 to address sanitary waste in Connor Creek and prevent contamination of the city's

drinking water. While some combined sewers remain in the GLWA wastewater collection system, ongoing efforts continue to reduce the impact of CSOs on the waterways in metro Detroit.

3.3.7.1 Lake Saint Clair Watershed

The LSCW is a sub watershed of the larger Lake St. Clair regional sub basin. It is approximately 41 square miles and spans along Lake St. Clair from the Clinton River Spillway in Harrison Township to the outlet of Lake St. Clair in the Detroit River. In 2006, the LSCW management plan identified critical areas of the waterbody that may contribute to non-point source (NPS) pollution in Lake St. Clair. These critical areas include EGLE-defined impairments and beneficial use impairments and were located in Lake St. Clair and along Memorial Beach and Milk River. Intake hydraulic modeling has shown that because the Belle Isle Intake itself is situated in a protected lagoon, it is largely protected from NPS pollution in the watershed. In fact, most NPS pollution moves along the shoreline and is transported away from the Belle Isle Intake. Thus, the water quality impairments along the river are largely localized.

Ongoing projects in the Belle Isle Intake SWA have focused on improving water quality through sanitary sewer overflow (SSO) control, waterfowl management, reduction in the volume of treated combined sewage to the Clinton River and Lake St. Clair, support of green infrastructure and other stormwater best management practices. Clinton Township has eliminated four SSOs and is working to construct relief sewers and improve existing sewer infrastructure with new sewer linings and manhole rehabilitation. In addition, the George W. Kuhn and Macomb County Chapaton Retention Basins have significantly expanded to increase in-system storage.

Ongoing projects, as of June 2020, to mitigate NPS pollution in the LSCW are listed in **Table 3-10**.

Table 3-10: Ongoing NPS Reduction Projects in the LSCW

Project Name	Quantitative Outcomes
Eliminating *E. coli* Sources and Beach Closure	• Eliminate approximately 1 MG per year of pollution impact • Reduction of beach closures • Improve perception of LSCW water quality
Illicit Discharge Elimination Program (IDEP)	• Improvement in water quality of surface waters • Reduction in beach closures

Source: SEMCOG Lake St. Clair Watershed Implementation Priorities Plan (2020)

3.4 Potential Contaminant Source Evaluation

Generally, those contaminant sources located in proximity to the intake will have the greatest potential to affect the deterioration of source water quality. Contaminant sources located closer the intake will be less mitigated by the dilution factor of the currents or the volume of the waterbody. Spills occurring in proximity to the intake either near shore or in the water will afford little time for the plant operators to react to shut down the intake to prevent contaminated source water from entering the intake.

3.4.1 Source Water Susceptibility

One of the purposes of the Belle Isle SWA Report (Appendix A) was to analyze the sensitivity and determine susceptibility of GLWA intake water to potential sources of contamination. Susceptibility was defined as a measure of the relative potential for contamination to reach the public water supply intake. Within the SWA, susceptible areas were identified as those areas most likely to impact the water supply-system. Potential sources of contamination within the susceptible area were then located. Based on the distribution of potential contaminant sources within the susceptible area, the type of contaminant source and the nature of chemicals used or stored, the potential contaminant sources were evaluated for the risk they present to the intake system.

The purpose of the susceptibility determination was to identify the factors that are highly favorable to contamination of the supply. Generally, the results of the susceptibility assessments determined that those land uses and potential contaminant sources closest to the intake posed the greatest threat to the safety of the drinking water supply.

3.4.2 Risk Categorization

The source water risk of contamination is primarily determined by two factors that include the vulnerability of the source water determined by natural protection features within the SWA (physical attributes of the lakes, rivers, and soils within a source water area) that serve to protect them against contamination at the water supply intake and threat of potential contaminant sources in the source water area. A drinking water threat can be defined as any chemical or pathogen that reaches the intake in concentration that deteriorates the quality of the drinking water supply. The potential contaminant sources were identified in Section 3.3. Due to natural protection features of the source water area such as the volume of the drinking source waterbody serving to isolate the intake from the potential contaminant sources, not every potential contaminant source in the SWA is a high risk to affect the source water quality.

One approach to differentiate the significant contaminant risks in the source water area is to identify those threats in closest proximity to the intakes and establish buffer zones. The boundary extents are determined by the response time required by plant operators to shut down the intake, and the estimated travel time of the contaminant source released from an inland location to travel through tributary drains or sewers and across the source water body to reach the intake.

3.4.3 Susceptibility Buffer Zones

Susceptibility buffer zones have been established around each GLWA intake to identify contaminant sources that have a higher potential to impact source water quality during an emergency spill or discharge event due to their proximity to the intakes. The susceptibility buffer zones are centered on the intake structures in concentric rings. The area encompassed within the boundary of the buffer zone is determined by estimating the time of travel for a contaminant released on land or water to reach the intake structure. A contaminant spilled or discharged within close proximity to the intake structure presents a higher risk during emergency events because little reaction time is available to initiate a shutdown of the intake system or implement other measures to preclude the spill from entering the intake system.

Two concentric buffer zones rings were established around the Belle Isle Intake. Buffer Zone 1 encompasses areas in closest proximity to the intakes. The boundary of the Buffer Zone 1 around each intake was established by estimating the time of travel for a spill or release of contaminant occurring within that area to travel to the

intake structure. The travel time for Buffer Zone 1 was established as an estimated 2 hours or less. This duration of time was established as any emergency spill occurring within this radius from the intake structure would likely go undetected before the spill reached the intake leaving no time for operators to react to implement intake system shutdown measures.

The area of Buffer Zone 2 extended out from the boundary of Buffer Zone 1 to encompass an area that would include contaminant travel times of up to an estimated 4 hours. A contaminant spill within the area represented by an estimated 2- to 4-hour time of travel may afford time for the spill to be identified and operators to be notified and intake isolation measures implemented before the spill reached the intake.

The buffer zone areas are extended across the international boundary to the Essex Region of Ontario, Canada. Under extreme wind or storm conditions, contaminants sources located within the Essex Region watersheds may be discharged to Lake St. Clair or the Detroit River and dispersed due to wind or unusual currents to the source waters of the Belle Isle Intake. The established buffer zone boundaries and the potential contaminant sources located within are discussed below.

The travel times for a contaminant spill to reach the intake included an inland tributary component time of travel that estimated time of travel in drains or municipal sewers and a time of travel from the discharge or mouth of the tributary to the intake. As the GLWA operates a combined sewer system, the velocity of flows in the sewers was used to determine travel time during a wet weather event with significant magnitude to cause CSO surcharge condition requiring overflow discharges to the Detroit or Rouge Rivers. The estimate is therefore conservative, by assuming that a spill coincides with a wet weather event with higher than nominal flow velocities.

3.4.3.1 Belle Isle Intake Buffer Zones

Figure 3-7 and **Figure 3-8** present the susceptibility buffer zones around the Belle Isle Intake for Federal and State database sources, respectively.

Figure 3-7 Belle Isle Intake Buffer Zones and Potential Contaminant Sources from Federal Databases

Figure 3-8 Belle Isle Intake Buffer Zones and Potential Contaminant Sources from State Databases

Table 3-11 presents the number of potential U.S. contaminant sources located within each buffer zone of the SWA.

Table 3-11: Summary of Potential Contaminant Sources within Buffer Zones retrieved January 2021 – Belle Isle Intake

Regulatory Database	Potential Contaminant Source Inventory	
	Buffer Zone 1 (Travel Time < 2 hr)	Buffer Zone 2 Travel Time 2-4 hrs
National Priorities List (Superfund)	0	0
Part 111, NREPA, 1994 PA 451 RCRA Hazardous Waste Treatment, Storage, and Disposal Facilities	386	1,019

Regulatory Database	Potential Contaminant Source Inventory	
	Buffer Zone 1 (Travel Time < 2 hr)	Buffer Zone 2 Travel Time 2-4 hrs
Part 211, NREPA, 1994 PA 451 Underground Storage Tanks (Active)	279	595
Part 213, NREPA, 1994 PA-451 Leaking Underground Storage Tank System Release	180	448
Part 201, NREPA, 1994 PA 451 Environmental Remediation	132	222
TRI	19	68
NPDES Permits	7	41
TSCA	7	10
MPART PFAS Sites	1	0
GLWA PFAS Sites	3	2

Based on the review of the Essex Region Source Protection Plan (Section 3.3) the potential sources of contamination from Canadian watersheds would only reach the Belle Isle Intake under extreme wind or storm events. The contaminants that could be expected under these conditions could be threats from pathogen or chemical spill related contaminant sources. The risk of contamination from these sources is considered low due to the extreme wind and storm events necessary to transport contaminants to Belle Isle Intake source water.

Of all potential contaminant sources identified within Buffer Zones 1 and 2, the spill or discharge of a toxic or pathogen contaminant under emergency conditions would likely have the highest potential for impact to the drinking source water at concentrations high enough to impact human health**. Figure 3-9** illustrates the locations of TRI and NPDES permit sites within Buffer Zones 1 and 2 only.

Figure 3-9 TRI and NPDES Sites in Belle Isle Intake Buffer Zones

4 Management Approaches for Source Water Protection

GLWA proposes to implement a combination of management approaches to protect its surface water intakes. The approach combines a number of new GLWA activities, along with enhancements to our stakeholder engagement program, and cross agency coordination programs. The management approach includes an implementation timetable in accordance with the EGLE SWIPP Guidelines.

4.1 Monitoring

GLWA is an active participant in the Huron to Erie Real-time Drinking Water Protection Monitoring Network. This is a regional real-time water quality monitoring and notification system established in 2006, and it is discussed in Section 5. The monitoring locations are shown in **Figure 4-1**, and the water quality measurements being conducted by the Network are identified in Error! Reference source not found.. These data are available online, and thus can easily be accessed by plant operators and other utility staff. The network has four goals:

1. The installation of monitoring equipment at various WTP intakes
2. Measuring certain water quality parameters every 15 to 30 minutes on a 24/7 basis
3. Sharing of real-time data from the monitoring network with each participating WTP
4. Development and use of a water quality notification/alarm system

The Network is expected to expand as a result of this SWIPP, with new testing locations and water quality constituents being added. The new water quality monitoring plans will be developed by GLWA water quality staff and the SWIPP intake teams. Water quality monitoring will continue to be conducted at the WTPs associated with each of the intake locations that are part of the Network.

A buoy has been installed at the Fighting Island Intake, and a pilot has been undertaken to explore the installation of a similar buoy at the Lake Huron Intake. GLWA is currently pursuing grants for additional research on source water monitoring.

Figure 4-1 Huron to Erie Monitoring Network

Source: Lake Huron to Lake Erie Real-time Drinking Water Protection Network - An Assessment of the Current Status and Recommendations for Reactivation, 2017

Table 4-1: Water Quality Parameters Measured by the Huron to Erie Monitoring Network

Municipality WTP	Temperature	Conductivity	DO	Turbidity	pH	ORP	Hydrocarbon	TOC	Chlorophyll	BGA-Phycocyanin	BGA-PC Raw
Port Huron		X			X						
Marysville[1]	X	X	X	X	X	X	X		X	X	X
St. Clair	X	X	X	X	X	X					
East China	X	X	X	X	X	X					
Marine City	X	X	X	X	X	X					
Ira Township	X	X	X	X	X	X					
New Baltimore	X	X	X	X	X	X	X		X	X	
Algonac	X	X	X	X	X	X					
Mt. Clemens	X	X	X	X	X	X	X		X	X	
Grosse Point Farms	X	X	X	X	X	X	X		X	X	
Water Works Park II (Belle Isle Intake)	X	X	X	X	X	X	X	X	X	X	X
Southwest Detroit (Fighting Island Intake)	X	X	X	X	X	X	X		X	X	X
Wyandotte	X	X	X	X	X	X					X
Monroe	X	X	X	X	X	X	X	X	X	X	

1. Monitoring for UV transmittance (UV254) also occurs at treatment facility.

Source: *Lake Huron to Lake Erie Real-time Drinking Water Protection Network, Assessment of the Current Status and Recommendations for Reactivation, 2017*

4.2 Priority 1 Site Inventory and Inspections

A list of priority sites based on hazard volume and storage is maintained by first responders to assist with emergency response. In the event of an emergency release, GLWA will work with emergency responders to determine any threats to the water quality at the Fighting Island intake.

4.3 Communication Pathway

GLWA has developed a formal communication pathway that includes intake protection, largely sourced or adapted from existing documents maintained by GLWA System Control, IWC, and Water Quality working groups. The plan includes the following elements:

- Annual update of Priority 1 Site 24-hour points of contact
- Annual update to the Emergency Response Plan (ERP)
- Communication plan with representatives of the Province of Ontario, Canada with specific consideration of petroleum pipeline crossings
- Cross-agency coordination (GLWA, EGLE, USCG, local LEPC etc.)

The communication pathway includes GLWA's security team and has been discussed among members of the GLWA intake teams, with the shared understanding that intakes are better protected when communication involves a "web" of sources rather than a straight-line path. Redundancy in the chain of communication can ensure that all parties involved are notified and updated in a timely manner.

4.3.1 Annual Training

As a component of the Communication Plan, two training exercises will be completed annually. One exercise will be devoted to an annual cross-agency coordination meeting. The other exercise will vary with needs and will emphasize preparedness and response measures through:

1. Tabletop spill drill exercises
2. Mock contingency plan implementation
3. Notification procedure testing
4. Command and control structure awareness
5. International spill response and coordination with Canadian government
6. Dissemination of public information during an event

4.4 Public Education

GLWA maintains a formal public outreach program that includes a Public Education Work Group. which addresses SWIPP topics. The Public Education Work Group agenda includes SWIPP topics quarterly with the goal of increasing public awareness of issues related to the Belle Isle intake.

An annual Public Education Activities Report is published by GLWA detailing public outreach efforts made during each calendar year. The report addresses the following topics:

1. Discussions at Public Education Work Group Meetings
2. Publication of Articles on the Member Outreach Portal
3. Educational Newsletters, Brochures, and Posters Distributed through the Member Outreach Portal
4. Social Media posts through GLWA Facebook and Twitter

Outreach and public education are also currently ongoing through various stakeholder groups, including SEMCOG, Friends of the Rouge and The Clinton River Watershed Council. These groups have been engaged in the preparation of this SWIPP and will continue to be engaged in SWIPP activities described in this section. More information on the role of stakeholder groups is described in Section 7 (Public Outreach).

4.5 Implementation Schedule

Per the EGLE SWIPP Guidance document (Appendix D), a management approach implementation plan schedule is required. Activities and timelines associated with this SWIPP report section are summarized in **Table 4-2**.

Table 4-2: Management Approach Implementation Timeline

Management Strategy	Time Frame and/or Frequency	Implementation year
Install monitoring buoy in Detroit River	-	2021
Update of ERP	Annually	2022

Management Strategy	Time Frame and/or Frequency	Implementation year
Cross-agency coordination meetings	Annually	2022
Training	Annually	2022
SWIPP topics on Public Education agenda	Quarterly	2022
Update SWIPP	Every six years	2027

5 Contingency Plans

The purpose of the contingency plan is to design a response to contamination of the drinking water source that may result from emergency contaminant spills resulting in the contamination of the drinking water source[1]. Typically, these types of contaminant emergencies afford little time for the plant operators to react to shut down the intake system. Contingency planning is necessary to ensure that if contamination of the drinking water source occurs, appropriate decision-making personnel are informed of the scope and severity of the situation and that established procedures are in place to respond to an event. With a contingency plan in place, mitigation measures can be implemented more rapidly and impacts to the water treatment process or threats to the public health can be reduced or avoided. The following sections discuss emergency intake shutdown procedures and water plant operating scenarios if an intake system must be shut down or isolated for an extended period (>24 hours).

5.1 Intake Shutdown

The initiation of any emergency response to contamination of the drinking source water begins with the communication of the threat. If a contaminant spill is recognized on land or in the source water there are several communication protocols established to alert the GLWA of the threat. Early notification and detection is essential to avoid contaminated source water from entering the intake system or the plants and upsetting treatment processes. Two contingency plans are presented for intake shutdown. The first assumes that the spill has been detected but has not entered the intake. The second scenario assumes that contaminated source water has entered the treatment plant.

5.1.1 Early Detection and Notification[2]

The key element in the GLWA response plan to emergency contaminant threat in the drinking source water is early detection and notification. With advanced warning, GLWA has the ability to isolate the intake from the source water before contaminants can enter the intake system and potentially cause upset of the treatment process. There are two primary mechanisms by which GLWA plant operators are alerted to a contaminant threat in the drinking water source.

GLWA can be notified of a spill through the NRC or the State/Local PEAS. PEAS is a statewide notification system that uses electronic alerts to provide notification of spills. For spills originating in U.S. waters, notification across the border begins when anyone calls one of the following: Michigan State Police, Michigan Department of Environmental Quality or the PEAS hotline.

PEAS uses the Michigan Health Alert Network (MIHAN), a secure web-based communication tool developed by the Michigan Department of Health and Human Services (MDHHS), to notify key first responders and drinking water plant operators if PEAS receives a report of hazardous substances release into the waterways and/or in the case of natural disaster, terrorism, or disease.

The GLWA is also a member of the Huron to Erie Drinking Water Monitoring Network. This system is designed to detect and notify operators of a chemical spill in the drinking source waters. This water quality monitoring network

[1] GLWA maintains an Emergency Response Plan covering all system assets and products, including contingencies for water supply disruption. The ERP is expected to be republished and regularly updated by GLWA.

has stations in Lake St. Clair, St. Clair River, Detroit River and Lake Erie. There are 14 participating municipalities involved in the network. The network water quality monitoring stations continuously monitors source water physical and chemical properties. This monitoring network provides near- real time water quality data to alert plant operators of detections that can instantly alert municipalities on the network to a threat. Continuous monitoring systems with early warning alerts can help identify potential issues before the water supply is disrupted and record detailed information to track historical water quality trends. GLWA and the Huron to Erie Drinking Water Monitoring Network also have access to a spill scenario tool developed by Michigan Technological University Research Institute and the National Oceanic and Atmospheric Administration (NOAA) Great Lakes Observing System (GLOS) which uses spill modeling to determine the average and maximum travel time of a spill and the probability that the spill will reach a modeled intake location.

5.1.2 Contaminant Spill Response Plan: Spill Is Detected Before Entering Intake System

- First Response Step – Notify Chain-of-Command.
- Establish Lines of Communication
- Implement Intake Shutdown – Decision of CEO, COO, or the Director of Water Operations.
- Emergency Notifications.
- Raw Water Quality Sample Monitoring.
- Short Duration Outage (<24 hours) - Reduce Pumping Conserve Storage.
- Extended Duration Outage (>24 hours) - Implement Alternate Water Supplies (see Section 5.2).

5.1.3 Contaminant Spill Response Plan: If Spill Is Detected After It Has Entered the Plant

- First Response Step – Notify Chain-of-Command.
- Establish Lines of Communication
- Identify Extent and Severity of Spill Emergency.
- Implement Intake or WTP Shutdown – Decision of the CEO, COO, or the Director of Water Operations.
- Water Quality Sampling/Testing - Determine Extent of Contamination.
- Emergency Notifications.
- Extended Duration Outage (>24 hours) - Implement Alternate Water Supplies (see Section 5.2).
- Initiate recovery phase after emergency response issues have been addressed.
- Dispose of Contaminated Water/Materials/Cleaning (intake tunnel; filter media; post-treatment storage).

5.2 Alternate Water Supplies

As part of the emergency response evaluation, alternate water supplies were investigated to determine the level of service that could be provided under emergency operating conditions resulting from the loss of a raw water

intake. This investigation assumes that the intake and associated water treatment plant would be lost for an extended period (>24 hours) and the system would be required to operate in an emergency mode indefinitely until the intake and plant could be brought back online. GLWA maintains an Emergency Response Plan for guidance regarding alternate water supplies in the event of a loss of the Lake Huron intake.

5.2.1 Loss of Belle Isle Intake

The Belle Isle Intake system conveys raw water to three of the GLWA water treatment plants, Springwells, Water Works Park and Northeast. On an average day, these plants provide over 66% of the daily demand. If these three plants are out of service the Lake Huron and Southwest Plants will not have capacity to serve all GLWA customers. An outage of the Belle Isle Intake for more than a day would create a water supply emergency. Several contingencies are available:

1. There is a secondary emergency intake on the Detroit River at Belle Isle that could be utilized for the condition where the protective lagoon of the primary intake is compromised or contaminated, but the Detroit River is not.
2. Emergency water distribution is an option if the secondary intake option is not available:
   a. Several bulk water providers are available in the region.
   b. Adjacent independent water systems may be able to provide emergency water.
   c. For an emergency condition, rationing and restrictions would be implemented.
3. An operational strategy could be available in the future, if capital improvements are implemented.
4. In the future, Springwells WTP may be able to receive finished water from Southwest WTP in the event of a Belle Isle intake shutdown.

GLWA's Emergency Site Plan for WWP WTP details specific actions for water treatment and distribution operations in the event of an emergency shut down of the Belle Isle Intake.

6 New Source Water Siting

Provisions for new water siting are recommended in the EGLE source water planning guidance document. However, given the surplus capacity of the existing three intakes identified in the 2015 Water Master Plan, it is unlikely that any new source will be developed nor is any new source considered in the GLWA Capital Improvement Plan.

7 Public Participation

The GLWA maintains a Public Education Work Group and a Customer Outreach Web Portal (https://outreach.glwater.org). The Work Group serves as a forum to proactively educate customers of water and wastewater issues through the Web Portal and through the online publication Operation Clean Water, which has produced 4–6 articles per year since 2011. The target audience includes wholesale and retail customers in the service area, as well as elected officials, public works staff, environmental groups, and the media. Content is served online and linked to on partner webpages such as SEMCOG (www.semcog.org) and The Greening of Detroit (GreeningDetroit.com).

Figure 7-1: Operation Clean Water Article

Accompanying YouTube videos showcase area water professionals and water success stories and provide counter-representation to the often negative media coverage of water issues within the GLWA service area. The Public Education Work Group has received several awards over the years, including the 2012 "Public Education Professional of the Year" from the Michigan Water and Environment Association. In 2016, GLWA developed and distributed educational messages about the SWIPP through the publication of three articles, a brochure, and seven social media posts. Operation Clean Water featured one of the articles on the GLWA SWIPP Program, with interviews of GLWA managers and other SWIPP practitioners. The outreach material also emphasized the impact of pharmaceuticals and personal care products (PPCPs).

In 2017, GLWA published two articles and two brochures. The outreach material discussed everyday actions that can reduce pollutants to the waterways, as well as harmful algal blooms. In 2018, GLWA published one article and three brochures focused on the Huron-to-Erie Real-Time Drinking Water Protection Network. In 2019, GLWA published one article, one flier, and two newsletters. In addition, GLWA launched the One Water campaign, which reached more than 25 million impressions during the spring and summer of 2019. Throughout the entire period, GLWA held Public Education Work Group meetings to develop the outreach material. GLWA annual outreach reports are included in Appendix E.

In addition to these educational vehicles aimed toward public awareness of water and wastewater issues, GLWA has partnered with SEMCOG to raise awareness of watershed and water quality issues, and to promote awareness of green infrastructure opportunities. Other educational activities in the watershed are advanced by local advocacy groups, such as The Alliance for the great Lakes, which engages in education (K-12 curriculum Great Lakes In My World) as well as stewardship (Adopt-A- Beach, coastal and shoreline cleanups, community green infrastructure projects).

Through the execution public education activities with its partners, GLWA will encourage public participation and enhance awareness of water quality issues. The elements of the public participation plan that encourage participation include:

1. Distribution of watershed management brochures
2. Install road/tributary crossing signs
3. Develop tabletop exhibit for display in township office and public events
4. PSA, ads, etc.
5. Earned media
6. Distribute/display "Ours to Protect" SEMCOG materials
7. Encourage public reporting of illicit discharges
8. Publicize hotlines
9. Distribute water quality trappings at public events (magnets, squishy balls, tote bags, etc.)
10. Display water quality posters from County Health Departments
11. Invite local schools to tour water treatment plant
12. Distribute household hazardous waste brochures
13. Inclusion and documentation of surface water intake protection activities, watershed protection activities, and related public outreach on the GLWA customer outreach web portal

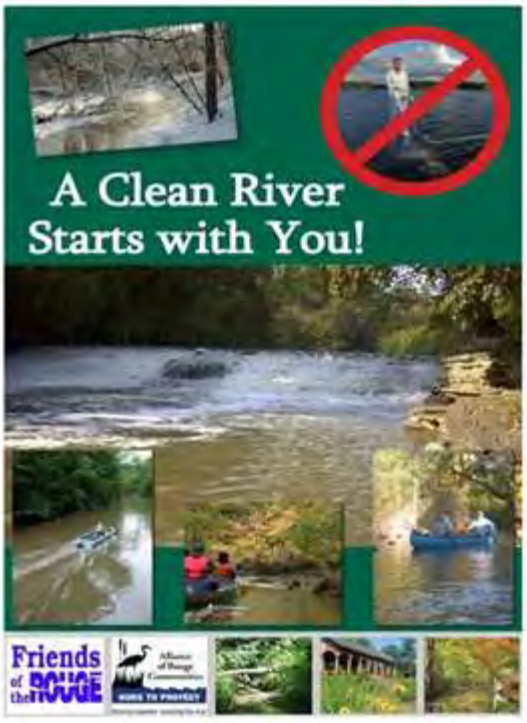


Figure 7-2: City of Dearborn Educational Poster for Watershed Protection

The Public Education Plan will be amended, based on funding and staff availability, to include a message that more directly addresses drinking water with linkages to watershed protection. Public Education implementation milestones are included in the Implementation Timeline (**Table 4-2**). Public education workgroup meetings on the SWIPP.

In addition, GLWA has received funding to partner with Friends of the Rouge River in 2022 to provide the following fee-based services for residential rain gardens:

- GSI maintenance
- Residential design/build
- Consultations
- Site analysis
- 50/50 incentives
- 90% subsidies

7.1 Regional Cooperative Source Water Intake Teams

Intake-specific Source Water Protection teams have been developed and have been engaged in the preparation of this plan through regular meetings and correspondence. Participants from relevant government agencies,

utilities, and stakeholder groups, as delineated below, will be responsible for executing and the periodically reviewing and refining this SWIPP. The team will meet on a semi- annual basis or more frequently as deemed appropriate by the team, and the SWIPP and will be updated on a biennial basis. **Table 7-1** itemizes the Belle Isle source water intake team.

Table 7-1: Belle Isle Intake Team

Name	Title	Organization	Phone	e-mail
Andrae Savage	GLWA WWP Plant Manager	GLWA	313-926-8133	Andrae.Savage@glwater.org
Terry Daniel	GLWA - Water Director	GLWA	313-926-8131	Terry.Daniel@glwater.org
Grant Gartrell	GLWA - Engineering Director	GLWA	313-926-8139	Grant.Gartrell@glwater.org
Mary Lynn Semegen	GLWA - Water Quality Manager	GLWA	313-926-8102	Mary.Semegen@glwater.org
Patrick Williford	GLWA - Water Quality	GLWA	313-926-8127	Patrick.Williford@glwater.org
Balvinder Sehgal	GLWA - Special Projects Manager	GLWA	313-925-8110	Balvinder.Sehgal@glwater.org
Jeff McKeen	General Manager	SOCWA	248-288-5150	jmckeen@socwa.org
Melita Jordan	Environmental Health Director	Wayne County Public Health	(734) 727-7400	
Anne Brasie	Executive Director	Clinton River Watershed Council	248-601-0606	
Marie McCormick	Executive Director	Friends of the Rouge	734-927-4901	mmccormick@therouge.org
Eric Witte	Deputy Director	City of Dearborn	313-943-2372	ewitte@ci.dearborn.mi.us

7.2 GLWA Technical Advisory Committee

GLWA has been closely engaged with elected officials, system operators, regulators, and technical specialists, which together comprise the Water Technical Advisory Committee (TAC). Various technical working groups contribute to the TAC, which meets quarterly to review working group progress with the overall objective of providing a “safe, secure, and reliable potable water supply.”

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Appendix A

Source Water Assessment Report for the City of Detroit – Belle Isle Intake Water Supply, March 2004

Source Water Assessment Report for the City of Detroit – Belle Isle Intake Water Supply

March 2004

Belle Isle Intake at Belle Isle
Detroit, Michigan

Prepared for:

City of Detroit Water and Sewerage Department; WSSN 1800

Prepared by:

U.S. Geological Survey, Water Resources Division, Michigan District
Michigan Department of Environmental Quality, Water Division
City of Detroit Water and Sewerage Department

Michigan Source Water Assessment Report 9

Executive Summary

The purpose of the Source Water Assessment is to analyze the sensitivity and determine susceptibility of a community's source of drinking water to potential sources of contamination.

Sensitivity is determined from the natural setting of the source water (raw water to the water treatment plant), and indicates natural protection afforded the source water. Using procedures established in the Great Lakes Protocol, the Michigan Source Water Assessment Program, results of a two-dimensional hydrodynamic model of the St. Clair River-Lake St. Clair-Detroit River Waterway, considering the effects of winds and circulation patterns in Lake St. Clair, and the influence of the Detroit River, the Belle Isle intake for the Detroit Water and Sewerage Department water treatment plants has a high degree of sensitivity to potential contaminants.

Susceptibility identifies factors within the community's source water area that may pose a risk to the water supply. The susceptibility determination provides information with respect to listed facilities and land areas within the source water area that should be given greater priority and oversight in implementing a source water protection program. The source water area for the Belle Isle intake includes 321 listed potential contaminant sources in the United States and 24 listed potential contaminant sources within the susceptible area; two known combined sewer drainage areas in the United States; potential urban combined sewers along Lake St. Clair; urban and agricultural runoff from the Saint Clair River, Clinton River and Lake Saint Clair watersheds, plus shipping traffic on these waterways. In Canada, the source-water area includes 5 National Pollutant Release Sites, and 18 permits for 28 sewage treatment and storage facilities. These potential contaminant sources, in combination with the highly sensitive intake, indicate that the Belle Isle source water is highly susceptible to potential contamination.

The Belle Isle source water is categorized as highly susceptible, given land uses and potential contaminant sources within the source water area. However, it is noted that historically, the City of Detroit Water and Sewerage Department water treatment plants have effectively treated this source water to meet drinking water standards. The City of Detroit has instituted pollution prevention programs, but should be cognizant of additional potential threats to its source of drinking water that are identified in this report. This report explains the background and basis for these determinations.

Using this Assessment

Clean, safe drinking water is fundamental to the viability of any community. Protecting the drinking water **source** is a wise and relatively inexpensive investment in your community's future. The overall intent of this assessment is to provide background information for your community to use in developing a local source-water protection program. The assessment benefits your community by providing the following:

- ***A basis for focusing limited resources within the community to protect the drinking water source(s).*** The assessment provides your community with information regarding activities within the **source water area** (**SWA**) that directly affect your water supply. It is within this SWA that a spill or improper use of **potential contaminants** may cause these contaminants to migrate toward the water **intake**. By examining where the source waters are most susceptible to contaminants, and where potential contaminants are located, the assessment clearly illustrates the potential risks that should be addressed.
- ***A basis for informed decision-making regarding land use within the community.*** The assessment provides your community with a significant amount of information regarding where your drinking water comes from (the source) and what the risks are to the quality of that source. Knowing where the resource is allows your community planning authorities to make informed decisions regarding proposed land uses within the SWA that are compatible with both your drinking water resource and the vision of growth embraced by your community.

- ***A basis for dealing with future regulations.***
  The assessment has been designed to functionally meet proposed requirements for surface-water supplies. Information needed to address regulatory needs and requirements has been collected and made available to your community through this report.

This source water assessment also provides the basis for a locally developed, voluntary source-water protection program. Communities interested in voluntarily developing source water protection programs should contact the Michigan Department of Environmental Quality (MDEQ) or by visiting the Department web page at http://www.deq.state.mi.us.

Introduction

In 1996, Congress amended the **Safe Drinking Water Act** and provided resources for state agencies to conduct source water assessments by identifying SWAs, analyzing the **sensitivity** of the source to natural conditions, conducting contaminant source inventories, and determining the **susceptibility** of the source to potential contamination. Delineations, sensitivity analyses, contaminant inventories, and susceptibility determinations comprise a "source water assessment." Assessments will be completed for every public water supply source in Michigan. To support this effort, the MDEQ Water Division established a partnership with the U.S. Geological Survey (USGS) to develop a method for conducting source water assessments for surface water supplies (Sweat and others, 2000; Sweat and others, 2001).

The requirements for public water supplies in Michigan to meet United States Environmental Protection Agency (USEPA) **maximum contaminant levels (MCLs)** provide some degree of assurance of safe drinking water; however, all systems are vulnerable to potential contamination. One of the best ways to ensure safe drinking water is to develop a local program designed to protect the source of drinking water against potential contamination. Not only does this add a margin of safety, but it also raises the awareness of consumers and/or the community of the risks of drinking water contamination. It is expected that source-water assessment results will provide a basis for developing a source-water protection program.

Background

The City of Detroit is located in Wayne County, on the southwest shore of Lake Saint Clair and along the west bank of the Detroit River (fig. 1). Since the founding of Detroit in 1701 when river water was collected with buckets and carried home by early colonists, the Detroit River has provided drinking water to residents. The City of Detroit assumed operation of the water supply in 1824 with the construction of the city's first water main system, consisting of wooden logs, and establishing the Detroit Water and Sewerage Department (DWSD) as a branch of the City of Detroit government. Besides serving City residents, the water supply also serves 126 neighboring southeastern Michigan communities throughout Wayne, Oakland, Macomb, Saint Clair, Lapeer, Genessee, Monroe,and Washtenaw counties. The DWSD maintains and operates three intakes facilities that supply water to five treatment plants. Of the three intakes, located at Port Huron, Fighting Island, and Belle Isle, the latter is the focus of this report.

The Belle Isle intake, located at the northeastern end of Belle Isle, near where Lake Saint Clair empties into the Detroit River, became operational in 1931. The intake is the primary raw water supply for Water Works Park Water Treatment pPant (WTP), Northeast WTP, and Springwells WTP. The Water Works Park WTP was originally constructed in 1879 with its own raw water intake located in the Detroit River. The City's growing population and industry prompted the expansion of WWP in 2003 and the construction of additional treatment plants in 1935 (Springwells WTP) and in 1956 (Northeast WTP). The intake system at Belle Isle consists of a lagoon and an intake structure. The lagoon is approximately 480 feet (ft) wide, 2,700 ft long, and 31 ft deep. Three floating wooden booms at the entrance to the lagoon protect the intake structure from ice and large debris floating down river. The intake structure is located at the western-most end of the lagoon. The structure houses twenty intake ports (7 by 20 ft each) and two intake shafts. One intake shaft supplies a 10-ft diameter tunnel to Water Works Park WTP, and the other a 15.5-ft diameter tunnel to Springwells and Northeast WTPs. An estimated capacity of the intake, based upon

DWSD Belle Isle Intake Lagoon

capacities of the WTPs receiving raw water, is 1.2 billion gallons per day. Two emergency intake tunnels (10 by 13 ft each) enter the intake facility downriver of the lagoon entrance on the north side of the island. Seasonal, sodium hypochlorite disinfection is practiced at the intake structure for controlling zebra mussels. All three WTPs employ chlorine disinfection, alum coagulation, flocculation, sedimentation, and rapid sand filtration. Raw source water is fluoridated when entering the screen house at each plant. The City has addressed taste and odor issues associated with the source water with activated carbon slurry, and turbidity removal with alum coagulation. Water Works Park II WTP is rated at 250 millions of gallons per day (MGD) and has a storage reservoir capacity of 55 million gallons. Northeast WTP is rated at 360 MGD and has a storage reservoir capacity of 37.5 million gallons. Springwells WTP is rated at 540 MGD and has a storage reservoir capacity of 60 million gallons. The distribution system is divided into three pressure districts consisting of approximately 720 miles of water mains. These districts are categorized as low, intermediate, and high. The low-pressure district includes Detroit's Central Business District and the lower east area, and is served by the Water Works Park and Springwells WTPs. The intermediate pressure district includes southwest Detroit (excluding downtown) and the downriver suburban areas and is served by the Southwest WTP. The high-pressure district includes the northern portion of Detroit, the north and northwest suburbs, and is served by the Northeast and Springwells WTPs. The DWSD Lake Huron WTP also serve northern Oakland County through the Imlay City interconnection. The Belle Isle intake facility provides source water for treatment to approximately 2.7 million of the 4.2 million people served by the Detroit Water and Sewerage Department (DWSD, 1999).

The study area for evaluating the extent of the Belle Isle intake SWA includes parts of the Lake Saint Clair, Clinton River, and Detroit River watersheds in the U.S., and parts of the Thames and Sydenham watersheds in Canada (fig. 1). Sources of information reviewed for this assessment include topographic maps, water supply monthly operation records, USGS documents, MDEQ reports, on-site interviews, private consulting reports, and local, state, and U.S. and Canadian Federal databases.

A sanitary survey for the Detroit water supply is currently being compiled (Stephen Ashford, Michigan Department of Environmental Quality, personal commun., 2001). Water treatment plants are periodically inspected by MDEQ to identify construction, maintenance, operational or source defects that could make them vulnerable to contamination, particularly from contaminants that are microbial in nature, such as fecal coliforms. Water suppliers are provided a sanitary survey report that notes any deficiencies in the system, and the state may direct the system to make necessary corrections. The sanitary survey is an important part of a safe drinking water program.

Climate

The Belle Isle intake water supply is located in the Southern Lower, South-Central Lower and Eastern Lower Peninsula Provinces (Rheaume, 1991), in the Lake St. Clair, Clinton River and Detroit River watersheds in the U.S. (USGS, 1974, 1982), and the Thames and Sydenham watersheds in Canada. The region experiences temperate summers with moderate winters. Average annual precipitation, reported at Grosse Pointe Farms weather station, for the climatic years 1951-1998 was 33 inches (NOAA, 1999), with about seven percent of total precipitation as snowfall between November and March (mean data from years 1987, 1995-1997, and 1999). Annual average runoff for the region, extrapolated from Miller and Twenter (1986, fig. 1) is 8 to 10 inches with the higher runoff values closer to Anchor Bay.

Detroit River – Source Water for DWSD Belle Isle Intake

Source Water Area Geology and Hydrology

The Belle Isle intake SWA is situated within the Lake Saint Clair, Clinton River, and Detroit River

Figure 1. Source water area (SWA) for the evaluation of the Belle Isle intake, Detroit, Michigan.

watersheds in the U.S., and parts of the Thames and Sydenham watersheds in Canada. The SWA consists of moraines, till plains, outwash and lakebeds of clay and sand, and is underlain by Antrim and Coldwater Shale, Bedford Limestone, Berea and Marshall Sandstones, the Michigan Formation, and deposits of the Traverse Group (Martin, 1936, 1955). Soils underlying the Belle Isle SWA vary among 5 soil complexes (U.S. Department of Agriculture, 1971, 1977, 1982; BASINS, 1998). They include sands and gravels, loam, muck, clay, silt, and combinations. The WWP, Northeast and Springwells WTPs obtain their source water from the Detroit River, just downstream of the mouth of Lake St. Clair at the headwaters of the Detroit River. Traverse Group deposits underlie the river at the intake, and Antrim Shale underlies Lake St. Clair.

Soil permeability is based on the calculated time of travel, in inches per hour (in/hr), for water to move vertically through a saturated soil zone. Soil thickness and permeability values are available in soil survey reports published by the National Cooperative Soil Survey and U.S. Department of Agriculture (U.S. Department of Agriculture, 1982). Permeability ranges from less than 0.06 in/hr, rated as very slow, to more than 20 in/hr, rated as very rapid.

Very slowly permeable soils significantly reduce the movement of water through the soil zone and, as a result, allow greater time for natural degradation of contaminants. However, such soils also provide for rapid overland transport of contaminants directly to receiving waters, which in turn may affect the water supply intake. In contrast, very rapidly permeable soils allow for rapid infiltration and passage through the soil zone from the surface. Such soils potentially allow rapid transport of contaminants with minimal contact-time available for contaminant breakdown. Erosion and transport of soils by surface waters can cause an increase in turbidity.. Area-weighted, depth-integrated permeabilities for the Belle Isle SWA range from 0.41 to as much as 4.96 in/hr (fig. 2). The mean permeability is 1.92 in/hr (Schneider and Erickson, undated, series of 5 maps; BASINS, 1998). Soils in the SWA range from primarily moderately and moderately slowly permeable soils over least sensitive drift lithology, to moderately rapidly permeable soils over least sensitive drift lithology in the southwestern area of the SWA (Lusch and others, 1992; BASINS, 1998). In reality, soil permeability has little bearing on source-water quality in the Belle Isle SWA because of the urban setting. The preponderance of permeable materials are paved or have other development on them, rendering them impermeable. A 1983 USEPA study (USEPA, 1983a, 198b, 1983c) reported impervious surfaces ranged from 9.7 to 64.3 percent of urban areas. Runoff from these areas is rapid, and generally directly to either storm sewers or receiving, or source, waters.

The Belle Isle SWA contains an area of about 93 square miles (mi^2). The most significant United States tributary to Lake St. Clair and the Detroit River upstream of Belle Isle is the Clinton River, located in the Mt. Clemens SWA (MDEQ, 2001), with a drainage area of about 734 square miles (mi^2). Between 1934 and 1999, as many as 27 stream gauges were operated in the Clinton River basin by the USGS (Blumer and others, 2000, p. xiv). Currently there are 25 gauges operated in the Mt. Clemens SWA. Annual mean discharges from the Clinton River to the Lake St. Clair ranged from 51 cubic feet per second (cfs) in 1934 to 3,090 cfs in 1946. Annual mean discharge for the

Lake St. Clair discharge to the Detroit River at Belle Isle

period of record is about 565 cfs. In Canada, the Sydenham and Thames Rivers are the principal tributaries to the St. Clair River and Lake St. Clair, respectively, with drainage areas of 2,043 mi2 and 4,330 mi2, respectively, and mean annual discharges of 1,861 cfs and 4,857 cfs, respectively (Holtschlag and Koschik, 2001).

Under ambient conditions, typical circulation patterns in Lake St. Clair are such that most water from Lake St. Clair ordinarily flows into the Fleming Channel, however, when winds are from the northeast, east, and (or) south, circulation patterns in Lake St. Clair are altered, and much of the lake water flows into the northern channel of the Detroit River around Belle Isle (Ayers, 1964). Under these conditions, water quality at the Belle Isle intake can vary from nominal conditions. Drifting buoy studies in the channel upstream of the intake indicate that flow in the north channel around Belle Isle is linear, and that little mixing occurs laterally (David Holtschlag, U.S. Geological Survey, personal commun., 2001).

A study by Hinshon (1997) of bacterial contamination at the Belle Isle beach concluded that the source of bacteria was derived from the island, not from CSO discharges on the Detroit shore. This conclusion indicates that it is unlikely that CSO discharges from Fox Creek or Conners Creek would affect the intake. Subsequently, drifting buoys were deployed at various locations upstream of water supply intakes in the St. Clair River, Lake St. Clair, and the Detroit River (Holtschlag and Aichele, 2001). Buoys released upstream of the Detroit—Belle Isle water supply intake indicate that currents in the reach upstream of the intake are primarily linear, with most water from Lake St. Clair entering the shipping channel on the south side of Belle Isle, which limits the transport of contaminants from one side of the channel to the other. These results indicate that the potential contaminant sources of concern primarily will be located upstream of the intake on the U.S. shore of Lake St. Clair.

Flow Model Drifting Buoy Calibration Study at Mouth of Detroit River- August 2001

A two-dimensional hydrodynamic flow model of the St. Clair River-Lake St. Clair-Detroit River (Connecting Channels) waterway, including a particle-tracking component, was developed to assess the potential travel paths of contaminants that may affect water supply intakes located in the Connecting Channels (Holtschlag and Koschik, 2001). Theoretical contaminant particles were tracked from release points upstream of each water supply intake. Particle tracking in Lake St. Clair and the Detroit River, upstream of the Detroit—Belle Isle water supply intake indicates that in most instances, only contaminants released into the Detroit River, immediately adjacent to, and in the flow path to, the Detroit—Belle Isle intake lagoon, would affect the water supply, and in most cases would likely bypass the intake lagoon. However, under certain conditions, such as favorable winds, unusual flow conditions, subsurface contaminant release, or distribution of contaminants across the channel or Lake St. Clair, upstream of the intake, some contaminants could be expected to reach the intake. Results of the model and particle tracking scenarios may be viewed online at http://mi.water.usgs.gov/splan2/sp08903/SCRIndex.html, and will be available in an upcoming report by David J. Holtschlag.

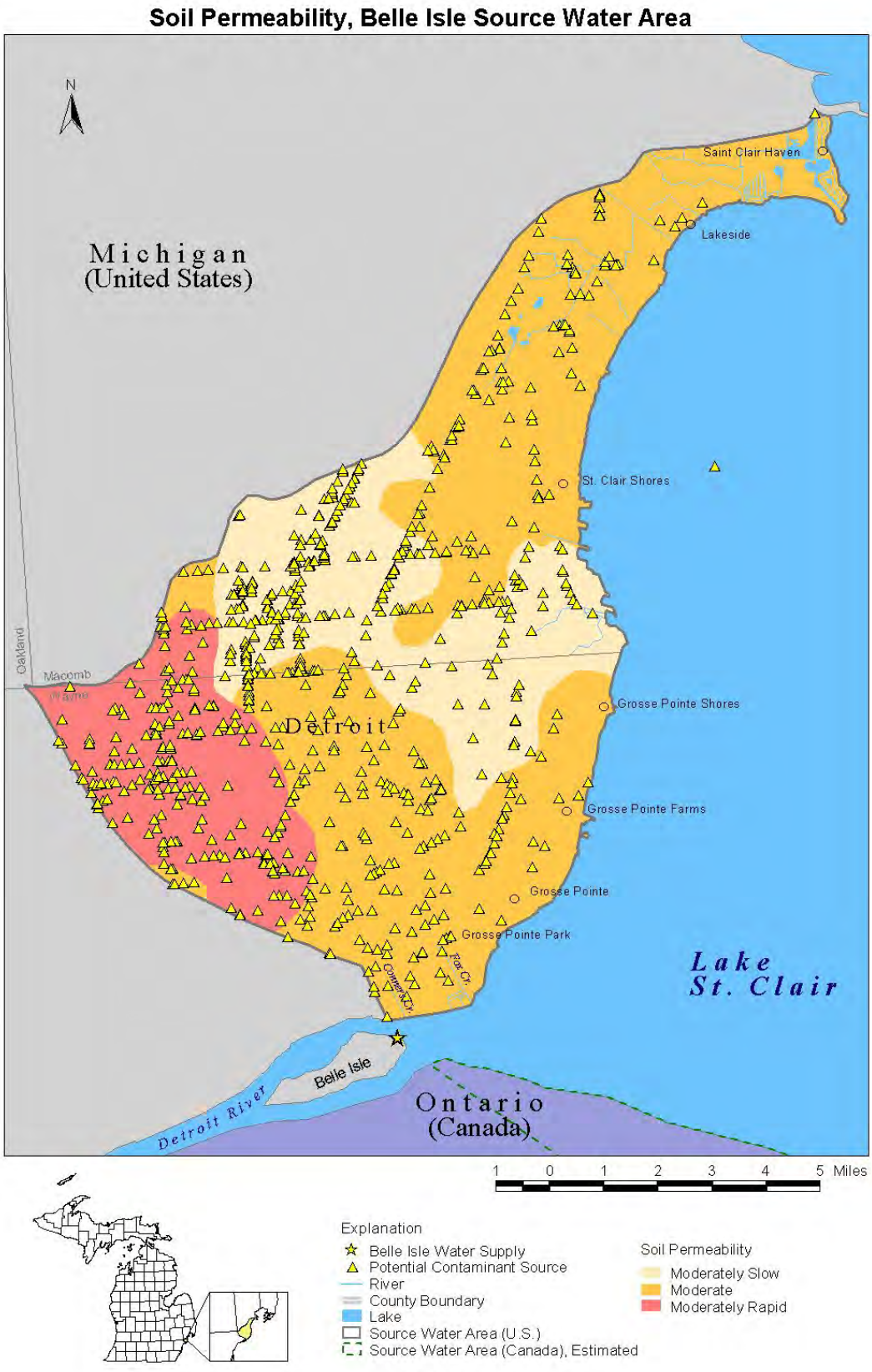

Figure 2. Identified Potential Point Source Contaminants shown on Soil Permeability for the Belle Isle Source Water Area, Detroit, Michigan.

History of Raw Water Quality of the Source

Public water supplies are required to routinely monitor raw water quality for selected parameters to optimize treatment, and to monitor treated water quality for a list of contaminants that is determined by MDEQ and required by the Safe Drinking Water Act. A detection of any contaminant may indicate that a pathway exists for contaminants to reach the intake. It is important to realize that the results from a given sample only provide information regarding the water quality at the time the sample was collected. Water quality can change with time for a number of reasons. The fact that a water sample does not contain contaminants is no guarantee that contamination will not occur in the future. Conversely, the detection of a contaminant in the past does not indicate that it will occur in the future.

DWSD records show that annual water use from WWP between 1992 and 1996 fluctuated between 581 and 1,198 MGD, with an average annual use of 230 billion gallons. Water quality and meteorological conditions have been monitored since about the mid 1800's. DWSD monitors raw and treated water for numerous inorganic and organic compounds, metals, nutrients, and pathogens, to name a few. Sampling conducted as part of the Information Collection Rule included samples for total organic carbon, which was detected at levels between 1.5 and 2.1 micrograms per liter (µg/L). However, DWSD at Water Works Park has not detected individual volatile organic compounds, other than xylene (DWSD, 1999) or synthetic organic compounds, other than trihalomethane (DWSD, 1999), in its source water. Between 1994 and 1999, the most frequently detected inorganic constituents detected in raw water at WWP were calcium, silicon, magnesium, and chloride. Raw water total coliform bacteria concentrations were between 4 and 900 colonies per 100 milliliters (ml) of water tested. Monitoring for the USEPA Information Collection Rule found empty cysts of *giardia* (G. Song Communication, January 2002) and no detectable *cryptosporidium*. Since 1992, DWSD has been testing homes to identify those where lead or copper may be present in finished water, which is primarily a function of household plumbing.

Source Water Assessment Methodology

Technical guidelines for completing source water assessments are contained in the Michigan **Source Water Assessment Program**, Assessment Protocol for Great Lakes Sources (Protocol) (MDEQ, 1999, Appendix L) available at http://www.deq.state.mi.us/dwr. In general, an assessment is a process for evaluating a drinking water supply and the potential for its treated water to exceed an MCL due to raw water contamination. A source water assessment considers the SWA, potential sources of contamination within the SWA, conditions of the water supply intake, and susceptibility to contaminants in order to identify potential risks to drinking water quality. Although the Protocol provides the minimum requirements and instructions on how to conduct an assessment, each water supply is unique with respect to how the process is carried out, due to local conditions and information. Sweat and others (2000, 2001) have developed and documented the methodology used in the preparation of this assessment.

Delineating Source Water Areas

Delineation of the SWA is accomplished by using **geographic information system** (GIS) software to map the watershed(s) that have the potential to affect source water at the intake. Using information from the water supply, a **critical assessment zone** (CAZ) is defined for the intake (MDEQ, 1999, Appendix L). A buffer is then created along any shoreline intersected by the CAZ, and from the edge of the CAZ to the mouth of any river(s) that might influence the intake. Finally, the buffer is extended along the shoreline of any river(s) that might influence the intake, from the mouth of the river to its headwaters. The area defined by the CAZ, river and shoreline buffers is termed the **susceptible area.** The susceptible area within the SWA defines locations where a water supply should focus its management strategies and resources to benefit the drinking water resources.

Using the Great Lakes Protocol and the Detroit Water and Sewerage Department water supply information:

- The CAZ for the Belle Isle intake is calculated as:

  1,625 (the length of the intake in ft.) x 11.5 (the depth of the intake in ft.) = 18,688 (unitless)
  This results in a CAZ of 3,000 ft (MDEQ, 1999, Appendix L), and the intake is rated as highly sensitive (fig. 3).

- The susceptible area inland from the river shoreline is calculated as:

  The distance the CAZ extends inland (3,000 – 1,625 ft. = 1,375 ft.), from the point the CAZ intersects the shoreline to the edge of the CAZ. The distance inland was determined from the floating booms at the mouth of the intake lagoon (fig. 4).

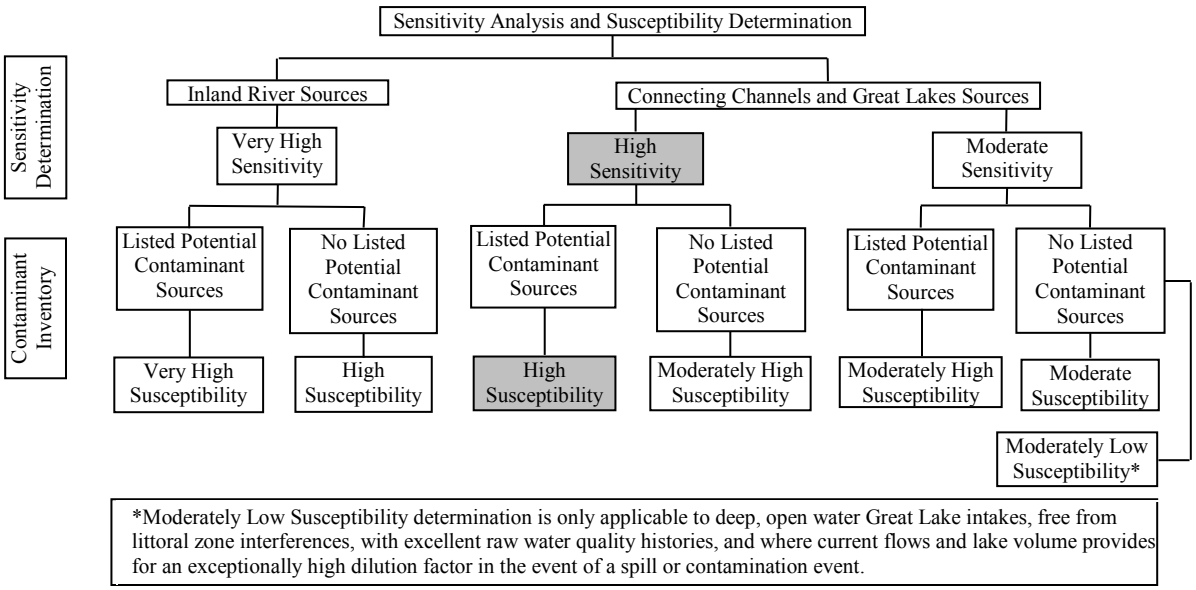

Figure 3. Surface Source-Sensitivity Analyses and Susceptibility Determinations

Contaminant Source Inventory

Past, current, and potential future sources of contaminants were inventoried to identify several categories of potential sources of contaminants including microorganisms (bacteria, protozoa, and viruses), inorganic compounds (nitrates and metals), organic compounds (solvents, petroleum compounds, pesticides), and disinfection by-products (trihalomethanes, haloacetic acids).

It is important to remember that sites and areas identified by this process are only **potential contaminant sources** (PCS) to the drinking water. Environmental contamination is not likely to occur when potential contaminants are used and managed properly. In addition, assumptions were made about particular types of land uses and risks associated with those land uses. Assumptions are discussed further in the results portion of this report.

The process for completing the inventory included several steps, which are summarized as follows:

1. Reviewed readily available land use maps and historical/current aerial photographs.
2. Plotted relevant information from applicable state and federal regulatory databases including the following lists:
   - Environment Canada: National Pollutant Release Inventory (NPRI);
   - MDEQ leaking underground storage tank (LUST) sites;
   - MDEQ registered underground storage tank (UST) sites;
   - MDEQ Environmental Cleanup Site Information System (ECSI) sites;
   - MDEQ Source Information System (for water discharge permit sites including National Pollutant Discharge Elimination System (NPDES) permits, Water Pollution Control Facility (WPCF) permits, storm water discharge permits, and on-site sewage (septic) system permits);
   - MDEQ Underground Injection Control (UIC) database;
   - MDEQ Active Solid Waste Disposal Permits list;
   - Macomb County Blue Ribbon Commission;
   - Michigan Department of Transportation (MDOT) - Hazardous Materials database;

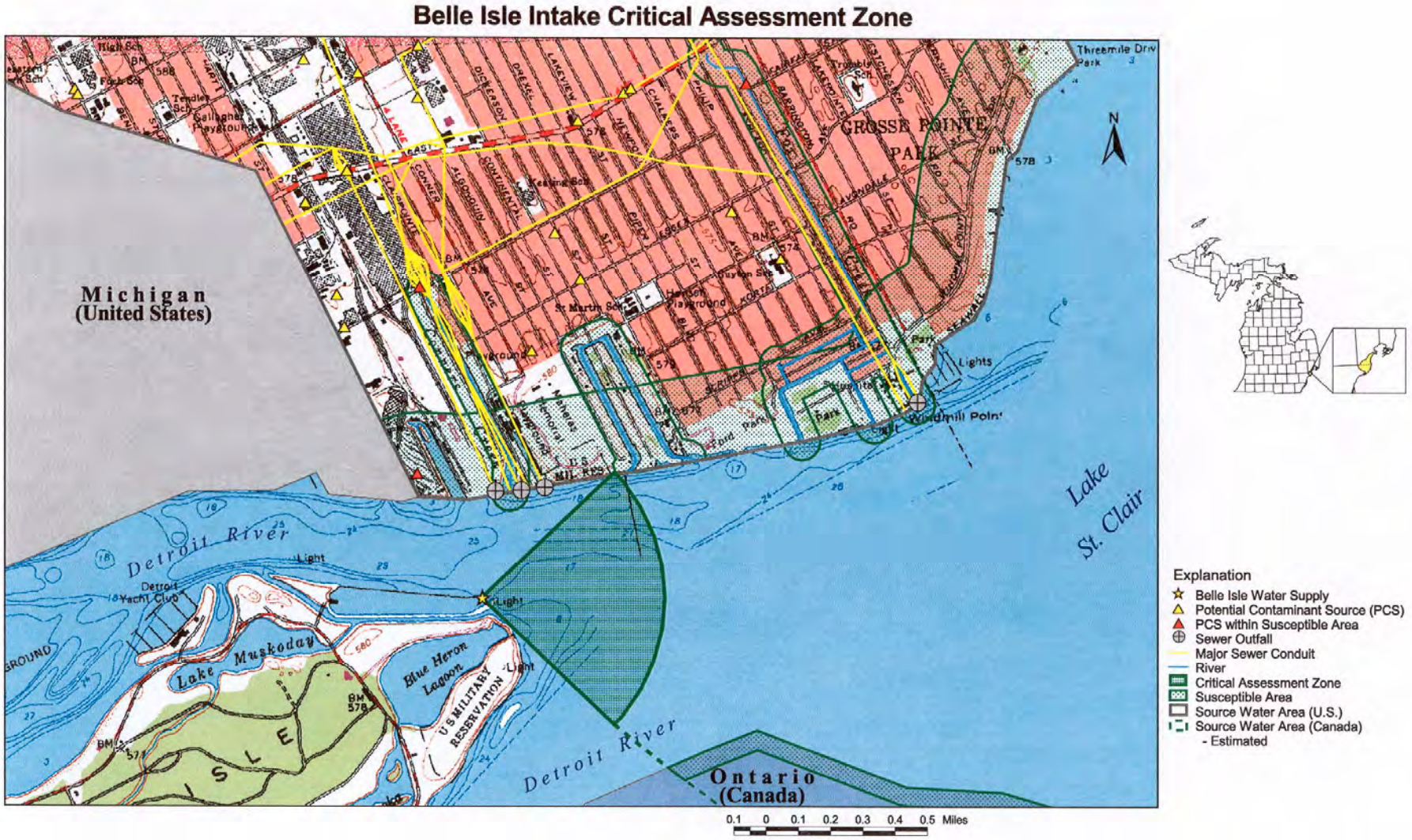

Figure 4. Critical assessment zone for the Belle Isle intake, Detroit Water and Sewerage Department, Detroit, Michigan.

- State Fire Marshall registry of above-ground fuel storage tank sites;
- State Fire Marshall Hazardous Material Handlers and Hazardous Material Incidents (HAZMAT) sites;
- U.S. EPA BASINS software, version 2.0.
- U.S. EPA Envirofacts database;
- U.S. EPA Resource Conservation Recovery Act (RCRA) generators or notifiers list;
- U.S. EPA RCRA Treatment, Storage, and Disposal Facility (TSDF) Permits list;
- U.S. EPA National Priorities List (NPL);
- U.S. EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLA) List;
- U.S. EPA RCRA Corrective Action Activity List (CORRACTS);
- U.S. Department of Transportation (DOT) Hazardous Materials Information Reporting System (HMIRS);
- U.S. EPA Toxic Chemical Release Inventory System (TRIS); and
- U.S. EPA Oil Pollution Act of 1990 Spill Response Atlas

3. Met with public water supply and community officials on November 30, 2000 to identify potential sources not listed elsewhere in databases or on maps and completed a preliminary inventory form to be used in completing the SWA base map. Subsequent contacts by email and telephone on numerous occasions to request additional data, clarify data, and discuss results.
4. Land use and/or ownership (for example, residential/municipal; commercial/industrial; agricultural/forest; and other land uses) was mapped and evaluated in relation to PCS, soil characteristics, and proximity to the intake.
5. Conducted an informal field inventory to locate additional PCS.
6. Completed final inventory form of PCS and plotted locations of PCS on the base map.

The purpose of the inventory is three fold: first, to provide information on the location of PCS, especially those within the susceptible area; second, to provide an effective means of educating the public about PCS; and third, to provide a reliable basis for developing a management plan to reduce potential contaminant risks to the Detroit water supply.

The inventory process attempts to identify potential point-source contaminants within the SWA. It does not include an attempt to identify specific potential contamination problems at specific sites, such as facilities that do not safely store potentially hazardous materials. However, assumptions were made about particular types of land use. For example, it is assumed that rural residences associated with farming operations have specific potential contamination sources such as fuel storage, chemical storage and mixing areas, and machinery repair shops. It should also be noted that although the inventory depicts existing agricultural uses (crops grown), these are likely to undergo continual change due to normal crop rotation practices. What is irrigated farmland now may be non-irrigated farmland next year, or vice versa.

The results of the inventory were analyzed in terms of current, past, and future land uses and their relationship to the susceptible area and the supply intake. In general, land uses and PCS that are closest to the supply intake pose the greatest threat to a safe drinking water supply. Inventory results are summarized in tables 1 and 2, and are shown on figure 5.

Table 1. Potential contaminant sources in the Belle Isle intake source-water area.

Type of Potential Contaminant Source	Number of Potential Contaminant Sources	PCS within the Susceptible Area and the CAZ
Hazardous or Solid Waste Site	858	20
Industrial Facilities Discharge Site	8	4
National Priority List Sites	7	0
Permit Compliance System	6	1
Toxic Release Inventory	55	0
Canadian Waste-Water Treatment Facilities	18	18
National Pollutant Release Inventory	261	5

Many PCS are readily identifiable because they have a single discharge point, and often a permit is required for these discharges. However, other PCS have diffused, poorly defined discharge locations. These are known as non-point discharges because they occur over large areas and may not be quantifiable by readily accepted methods. These non-point source discharges are difficult to identify and control, and consequently to quantify, yet they are a major source of water pollution (Carpenter and others, 1998). Non-point sources also include atmospheric deposition over water and land, and include urban, rural, and agricultural runoff from areas such as lawns, golf courses, farm fields, pastures, parking lots and roadways. Runoff from these areas can contain many types of pollutants including sediments, metals, organic and inorganic chemicals, viral and bacterial pathogens, pharmaceuticals, and animal wastes. Transportation also represents a non-point source of contamination. Trucking, rail roads, and shipping all transport potential contaminants through the SWA. An accident causing a spill could lead to potential contaminants entering a storm sewer, or in the case of shipping, directly discharge to the Detroit River, possibly near the intake (Snyder and others, 2001). Non-point sources of concern to the Detroit water supply are primarily from industrial and urban runoff, and from CSOs and SSOs.

Storm sewer and wastewater-treatment-plant outfalls are also of concern to the Detroit water supply (fig. 4). The Conner Creek outfall is immediately across the Detroit River from the intake. Studies by DWSD (HEC, 1997; U.S. Department of Health, Education, and Welfare, 1965) and by USGS (Dave Holtschlag, personal commun., 2001) indicate flow velocity and volume in the Detroit River likely preclude discharges from Connor Creek from reaching the intake. However, sewer-outfalls along the shore of Lake St. Clair pose similar risks, and under certain wind, current, and mixing conditions, could potentially affect the intake (Ayers, 1964; David Holtschlag, U.S. Geological Survey, personal commun., 2001). The Macomb County Blue Ribbon Commission identified 18 permits to discharge to the Sydenham and Thames rivers that include 28 waste-water treatment plants, holding lagoons, and settling basins in Ontario (Bill Smith, Macomb County Blue Ribbon Commission, written commun., 2001).

Upstream of the DWSD Belle Isle intake, there are four confined disposal facilities (CDF) in the Connecting Channels (Miller, 1998). In addition, there are twenty-one wastewater-treatment plant outfalls on the U.S. side of the St. Clair River and Lake St. Clair, and twenty-four wastewater-treatment plant outfalls on the Canadian side of the St. Clair River and Lake St. Clair (Bill Smith, Macomb County Blue Ribbon Commission, written commun., January, 2000). The majority of these outfalls are for secondary treated wastewater (22). Other outfalls include primary treated water (1), tertiary treated water (5), retention-basin discharge (6), equalization basin discharge (1), and lagoon discharge (10). Most of these treated wastewater outfalls are located in the Clinton River, the St. Clair River, the Thames River, or the Sydenham River. Contaminants from the Clinton River have potential to be carried across Lake St. Clair to the Detroit River by currents generated from sustained winds. The wind directions causing these currents include those from the north, northeast, east, west, and south (Ayers, 1964). Contaminants from the St. Clair, Thames, and Sydenham rivers are principally carried across Lake St. Clair into the Fleming Channel, except under the influence of northeast, east, or south winds, which may cause water from these tributaries to mix across the mouth of Lake St. Clair and enter the Detroit River channel between Belle Isle and Detroit.

In general, PCS within the susceptible area pose greater risk than those outside the susceptible area. The presence of PCS within the SWA indicates potential sources of chemicals that could, if improperly managed or released, affect the water quality at the intake. A small quantity of these chemicals, in some cases a gallon or less, can significantly affect the supply. Also of concern is the location and distribution of these sources with respect to highly permeable soils. The susceptible area consists of primarily urban, industrial, and developed land. Overlaying the PCS location and the soil permeability map for the Belle Isle source-water area indicates that none of the located PCS are located on or very near to areas with moderately rapid to rapidly permeable soils.

The results of the PCS inventory performed for Belle Isle source water area is shown on figure 5 and is summarized as a function of PCS location relative to the susceptible area. The inventory results indicate that there are 24 PCS, holding 25 permits within the susceptible area in the U.S., and 23 PCS holding 28 permits within the susceptible area in Canada (table 2).

Table 2. Potential contaminant source-inventory results for the Belle Isle intake source-water area.

Site Name	*ID Number*	*Reason for Permit*	*Reason for listing as Potential Contaminant Source*
GROSSE PT PARK CSO[a]	MI0037273	Waste Water, Dust and Process Water	Permit Compliance System
SUNOCO SVC STATION	MID000675819	On-Site Storage	Hazardous or Solid Waste Site
WOOSTER IND. SVC	MID000717074		
CHRYSLER CORP CLAREPOINT PRE-PROD PLT			
ZENITH INDUSTRIAL	MID006539712		
JEFFERSON MOTOR SVC	MID017255860		
HURON POINTE MARINE	MID121526164		
SEMTA MACOMB TERMINAL	MID981777592		
MERCURY PLASTICS CO	MID981790553		
VIMCO CORP	MID981790553		
EFFICIENT SANITATION	MID985566397		
HISTOLOGY ASSOCIATES INC	MID985573088		
UNITED 6200	MID985595735		
SPEEDWAY 2207	MID985595776		
CLARK OIL STA. NO 1207	MID985606177		
AMOCO OIL CO 5407 COLONIAL	MID985606573		
FISHER DYNAMICS	MID985573062		
TENIDAC GRAPHION INC	MID985611334		
SWIFT ENTERPRISES	MID985662618		
ST CLAIR DEVELOPMENT CO	MI0000042044		
NU APPEARANCE INC	MI0000100974		
DECO-CONNERS CR PLT	MI0001775	Cooling, Process, Treatment and/or Waste Waters	Industrial Facilities Discharge Site
VILLAGE OF GROSS PT SHORES	MI0026085		
INTER-CTY DRAINAGE BD-MILK RIV	MI0025500		
GROSSE PT PARK CSO[a]	MI0037273		
KRUPP FABCO	1464		National Pollutant Release Inventory
DURA-CHROME LTD	4598		
OXFORD SUSPENSION LTD WALLACEBURG	3152		
WABTEC FOUNDRY LIMITED	4472		
WALTEC FORGINGS INCORPORATED	4432		

Site Name	*Data Base*	*Level of Treatment*
BELLE RIVER-MAIDSTONE WPCP	Macomb County Blue Ribbon Commission	Secondary
COMBER LAGOONS		Lagoon
LITTLE RIVER WPCP		Secondary
CHATHAM WPCP		Secondary
DRESDEN WPCP		Secondary
MITCHELL'S BAY LAGOON		Lagoon
MERLIN LAGOONS		Lagoon
RIDGETOWN LAGOONS		Lagoon
THAMESVILLE WPCP		Secondary
WALLACEBURG WPCP		Secondary
ALVINSTON WPCP		Secondary
OIL CITY LAGOONS		Lagoon
BRIGDEN LAGOONS		Lagoon
OIL SPRINGS LAGOONS		Lagoon
PETROLIA WPCP		Tertiary
PORT LAMBTON LAGOONS		Lagoon
WATFORD LAGOONS		Lagoon
WYOMING WPCP		Tertiary
KILWORTH HEIGHTS WPCP	Macomb County Blue Ribbon Commission	Secondary
ADELAIDE WPCP		Secondary
GREENWAY WPCP		Secondary
OXFORD WPCP		Secondary
POTTERSBURG WPCP		Secondary
SOUTHLAND PARK WPCP		Secondary
VAUXHAUL WPCP		Secondary
WESTMINSTER WPCP		Secondary
LIDERTON WPCP		Secondary
STRATHROY LAGOONS		Lagoon

Sensitivity Analysis

Sensitivity is the natural ability of a SWA to provide protection against the contamination of the water supply intake, and includes physical attributes of lakes, rivers, and soils. The sensitivity analysis requires consideration of several different variables related to the natural environment, for example:

- Water quality history of the source.
- Distribution of moderately rapid to rapidly permeable soils.
- Amount of available water from precipitation or runoff.
- Potential for runoff to affect the intake.
- Nature of the intake, including: depth, distance from shore, age, and materials used.
- Surface water flow patterns in vicinity of intake.

To perform this analysis, USGS, MDEQ, and the operators of the Detroit Water and Sewerage WTPs collected, researched, and analyzed information from the WTP, monthly operator reports, sanitary surveys, soil maps, published reports, and historical plant operation and raw water quality data. The Michigan SWAP has three categories of sensitivity for surface water sources ranging from moderately sensitive to very highly sensitive. Analysis of this information, using guidelines provided in Sweat and others (2000, 2001), indicates that the Belle Isle intake is in the middle of this range or highly sensitive (fig. 3). This means that the natural environment offers little protection against contamination of the water supply intake.

Susceptibility Determination

Susceptibility is the relative potential for contamination to reach the public water supply intake used for drinking water purposes. Whereas the sensitivity of a water supply is the natural ability of the area to protect the intake against contamination, the susceptibility determination also takes into account other factors that will affect whether a contaminant reaches the intake. Whether or not a particular drinking water source becomes contaminated depends on three factors:

(1) The distribution of PCS;
(2) The source water area; and
(3) The natural protection, or sensitivity, of the source.

In conducting a susceptibility determination, the part of the SWA that yields water to the water supply-system intake is identified by establishment of the susceptible area within the source water area. PCS within the susceptible area are then located. Based on the distribution of PCS within the susceptible area, the type of PCS, and the nature of the chemicals they use or store, PCS are analyzed for the risk they may represent to the water supply intake. Along with the presence and distribution of PCS, the sensitivity analysis is then used to determine the susceptibility of the water supply (fig. 3). This leads to a determination of whether the drinking water source is moderately susceptible, highly susceptible, or very highly susceptible to contamination (Sweat and others, 2001). It is important to understand that a system can have low sensitivity relative to some conditions (for example, intake construction and location), and high susceptibility because of other conditions (for example, the type of PCS). In Michigan, surface water sources of drinking water range from moderately low to very-high susceptibility. Based on high sensitivity and listed potential contaminant sources, the DWSD Belle Isle intake is highly susceptible to potential contaminants.

When a public water supply is determined to have a moderate, high, or very high susceptibility because of a particular condition or set of conditions, there is a significant risk of contamination of the drinking water source because of that condition or set of conditions. Although the susceptibility determination does not predict when or if contamination will actually occur, it does recognize conditions that are highly favorable for contamination of the supply. In the event of a contaminant release to soils or surface water within the susceptible area, it is very likely that contamination at the intake would occur without completion of remedial actions.

If a public water supply's drinking water source is determined to be highly susceptible, it is recommended that the system identify the condition(s) that lead to the high susceptibility. Immediate steps should be taken to protect the source, and action should be considered to remedy the condition (for example, repairing or replacing faulty intake construction, working directly with facility operators to implement sound management practices, etc.).

All water supplies, regardless of their susceptibility, should consider identified factors that could lead to higher susceptibility in the future, and should prepare a strategy to protect the water supply source. Raising public awareness through signs and other education programs, encouraging proper intake construction and the use of best management practices in existing facilities are good ways of ensuring that a surface source maintains its moderate susceptibility rating.

Figure 5. Identified Potential Point-Source Contaminants within the Belle Isle Source Water Area, Detroit, Michigan ıte

Summary and Recommendations

The actual susceptibility of the drinking water source of a water supply depends on a number of contributing factors, some of which are only slightly related. Sensitivity is determined from the natural setting of the source and identifies the natural protection afforded to the source water. Susceptibility is determined by identifying those factors within the community's SWA that may pose a risk to the source water. The susceptibility determination provides information with respect to facilities within the SWA or land areas within the SWA that should be given greater priority and oversight in the implementation of a drinking water protection program.

Sensitivity Analysis: Based on criteria adopted in the Great Lakes Protocol of the Michigan Source Water Assessment Program, the Belle Isle intake in the Detroit River for the Waterworks Park, Northeast and Springwells WTPs has a high degree of sensitivity to potential contaminants. When considering circulation and discharge patterns in Lake St. Clair, the Belle Isle intake is categorized as highly sensitive.

Susceptibility Determination: The SWA for the Belle Isle intake includes 48 listed potential contaminant sources within the susceptible area, storm-sewer drainage areas and outfalls, and urban and industrial runoff. Combining these potential contaminant sources with the highly sensitive intake yields a highly susceptible determination for Belle Isle source water (fig. 3).

Effective Treatment: While it has been determined the Belle Isle source water is highly susceptible to potential contamination, it is also noted the Detroit Water and Sewerage Department has, historically, effectively treated this source water to meet drinking water standards with minimal complaints from the public. This assessment provides the City with a basis to institute a source-water protection program as another tool to assure the continued safety of its water supply.

The results of this assessment and the recommendations based on these results are summarized as follows:

- ***Intake -*** The Belle Isle water supply intake was constructed in 1931, and draws water from the Detroit River, 1,625 ft. from Detroit's shore at the northeast end of Belle Isle, making it a highly sensitive intake.
- ***Soils*** – Using a mean, area-weighted, depth-integrated permeability estimation, the soil and subsoil material in the SWA range from 0.41 in/hr to as much as 4.96 in/hr. The mean permeability is 1.92 in/hr (Schneider and Erickson, undated, series of 5 maps; BASINS, 1998). None of the soils in the Belle Isle SWA are rapidly permeable. Many of the PCS are located in the SWA on low permeabilitysoils. These factors combine to make the SWA, and thus the intake, highly sensitive. The community should take steps to evaluate current and future land use in areas of highly permeable soils, particularly those occurring within the susceptible area. Those PCS that have been identified either on or in close proximity to these soils should be informed of the sensitive nature of the area and encouraged to adopt best management practices designed to minimize the risk of a ground release. Residential areas that have been developed on these soils should be targeted for educational programs identifying steps that residents can take to protect the water supply.
- ***Historical Contaminant Detections -*** The Detroit water supply has not detected any volatile organic compounds or synthetic organic compounds in its source water.
- ***Sanitary Survey -*** A sanitary survey for the Detroit water supply is currently being compiled (Stephen Ashford, Michigan Department of Environmental Quality, personal commun., 2001). It is important that the water supply continue to follow good management practices.
- ***Potential Contaminant Sources -*** A review of the PCS inventory and the moderately and rapidly permeable soil distribution indicates that the Belle Isle SWA has many PCS located on low permeable soils. Within the susceptible area, there are 24 PCS with 25 discharge permits. It is recommended that the community focus initially on PCS that are within the susceptible area as they pose the greatest potential threat to the water supply. These facilities should be made aware of free technical assistance that is available through MDEQ's pollution prevention programs. Through chemical inventory, waste reduction, and by increasing awareness of best management practices, the risk these facilities pose to source waters can be reduced. The PCS inventory indicates that the source is highly susceptible.
- ***Source Water Assessment -*** The Belle Isle source water assessment is based on these site-specific parameters:
    1. Definition of a Critical Assessment Zone for a highly sensitive source;
    2. Definition of a SWA for the Saint Clair River, Clinton River, Detroit River, Lake Saint Clair, and the shoreline near the intake;
    3. Wind and current patterns in Lake Saint Clair and their effects on source water quality; and
    4. Listed and nonlisted potential contaminant sources.
- ***Source Water Protection*** – The City has initiated source-water protection activities with an Industrial Pretreatment Program incorporating management plans, chemical containment, spill response, spill response training, and a street-cleaning program. The City also has initiated a mercury reduction program.

The Detroit Water and Sewerage Department and/or the neighboring communities should assemble a team to assist in the development and implementation of a source-water protection program that uses this assessment to further protect the Belle Isle source water area.

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GLOSSARY

Critical Assessment Zone (CAZ) – the area from the intake structure to the shoreline and inland, including a triangular water surface and a land area encompassed by an arc from the endpoint of the shoreline distance on either side of the on shore intake pipe location

Geographic Information System (GIS) – a system to capture, store, update, manipulate, analyze, and display all forms of geographically referenced information

Intake – the point at which source (raw) water is drawn into a pipe to be delivered to a water treatment plant

Maximum Contaminant Level (MCL) – the maximum permissible level of a contaminant in water that is delivered to any user of a public water system

Potential Contaminant Sources (PCS) – listed and non-listed agricultural sites, businesses, and industries that have the potential to cause contaminants to be introduced into source water

Sensitivity – a measure of the physical attributes of the source area and how readily they protect the intake from contaminants

Source – the water body from which a water supplier gets its water

Source Water Area (SWA) – the land and water area upstream of an intake that has the potential to directly influence the quality of the water at the intake

Source Water Assessment Program (SWAP)– in Michigan, the process defined by the state Department of Environmental Quality to complete assessments of all the state's public water supplies

Susceptibility – the Susceptibility identifies factors that may pose a risk within the community's source water area

Susceptible Area – the area defined by the critical assessment zone and a buffer on either side of any drainages that contribute water to an intake

Synthetic Organic Contaminants (SOC) – Manmade organic chemical compounds such as pesticides, etc.

Tannins – naturally occurring phenolic compounds that precipitate proteins, alkaloids, and glucosides from solution that has a yellowish appearance

Volatile Organic Contaminants (VOC) – Unnatural, volatile organic chemical compounds such as gasoline components, solvents, degreasers, etc.

Appendix B

United States Army Corps of Engineers Waterborne Commerce of the United States – Summary of Foreign and Domestic Shipping Traffic for the Detroit River and Lake St. Clair 2016-2019

Summary of Foreign and Domestic Traffic on the Detroit River (CY 2016-19)				
Commodity	CY2016 tons	CY2017 tons	CY2018 tons	CY2019 tons
20 Petroleum and Petroleum Products	**1,334,185**	**1,288,950**	**1,276,471**	**1,324,095**
21 Crude Petroleum	0	0	0	0
2100 Crude Petroleum	0	0	0	0
22-29 Petroleum Products	1,334,185	1,288,950	1,276,471	1,324,095
2211 Gasoline	219,204	271,949	256,283	227,976
2221 Kerosene	0	0	73,611	13,468
2330 Distillate Fuel Oil	166,005	168,011	98,128	342,595
2340 Residual Fuel Oil	119,130	140,673	91,426	78,822
2350 Lube Oil & Greases	0	265	0	0
2410 Petro. Jelly & Waxes	0	0	0	0
2429 Naptha & Solvents	0	24,803	32,536	4,943
2430 Asphalt, Tar & Pitch	429,717	396,065	367310	289,722
2540 Petroleum Coke	393,362	287,184	357,177	316,235
2640 Liquid Natural Gas	0	0	0	50334.00
2990 Petro. Products NEC	6,767	0	0	0
30 Chemical and Related Products	**296,040**	**179,190**	**225,470**	**111,899**
31 Fertilizers	105,295	46,867	50,472	21,890
3110 Nitrogeneous Fert.	26,729	0	14	0
3120 Phosphatic Fert.	0	0	0	0
3130 Potassic Fert.	78,566	33,639	50,458	21,890
3190 Fert. & Mixes NEC	0	13,228	0	0
32 Other Chemicals and Related Products	190,745	132,323	174,998	90,009
3211 Acrylic Hydrocarbons	3,332	3,488	20,064	0
3212 Benzene & Toluene	16,536	0	0	0
3219 Other Hydrocarbons	0	0	0	0
3220 Alcohols	58,333	59,026	8,442	4,543
3230 Carboxylic Acids	0	0	0	24,459
3240 Nitrogen Func. Comp.	0	0	0	0
3250 Organo-Inorganic Comp.	0	0	490	0
3260 Organic Comp. NEC	0	0	0	0
3271 Sulphur (Liquid)	0	0	0	0
3272 Sulphuric Acid	0	0	14,572	0
3273 Ammonia	0	0	0	0
3274 Sodium Hydroxide	0	0	0	0
3275 Inorg. Elem., Oxides, & Halogen Salts	192	0	99,285	48,218
3276 Metallic Salts	73,547	69,801	32,144	5,754
3279 Inorganic Chem. NEC	0	0	0	0
3281 Radio active Material	0	0	0	0
3282 Pigments & Paints	0	0	0	0
3283 Coloring Mat. NEC	0	0	0	0
3284 Medicines	0	0	0	0
3285 Perfumes & Cleansers	0	0	0	396
3286 Plastics	0	0	1	6,614
3291 Pesticides	0	0	0	0
3292 Starches, Gluten,	0	0	0	0
3293 Explosives	0	0	0	0
3297 Chemical Additives	38,805	0	0	25
3298 Wood & Resin Chem.	0	0	0	0
3299 Chem Products NEC	0	8	0	0

Source: U.S. Army Corps of Engineers Waterborne Commerce of the United States

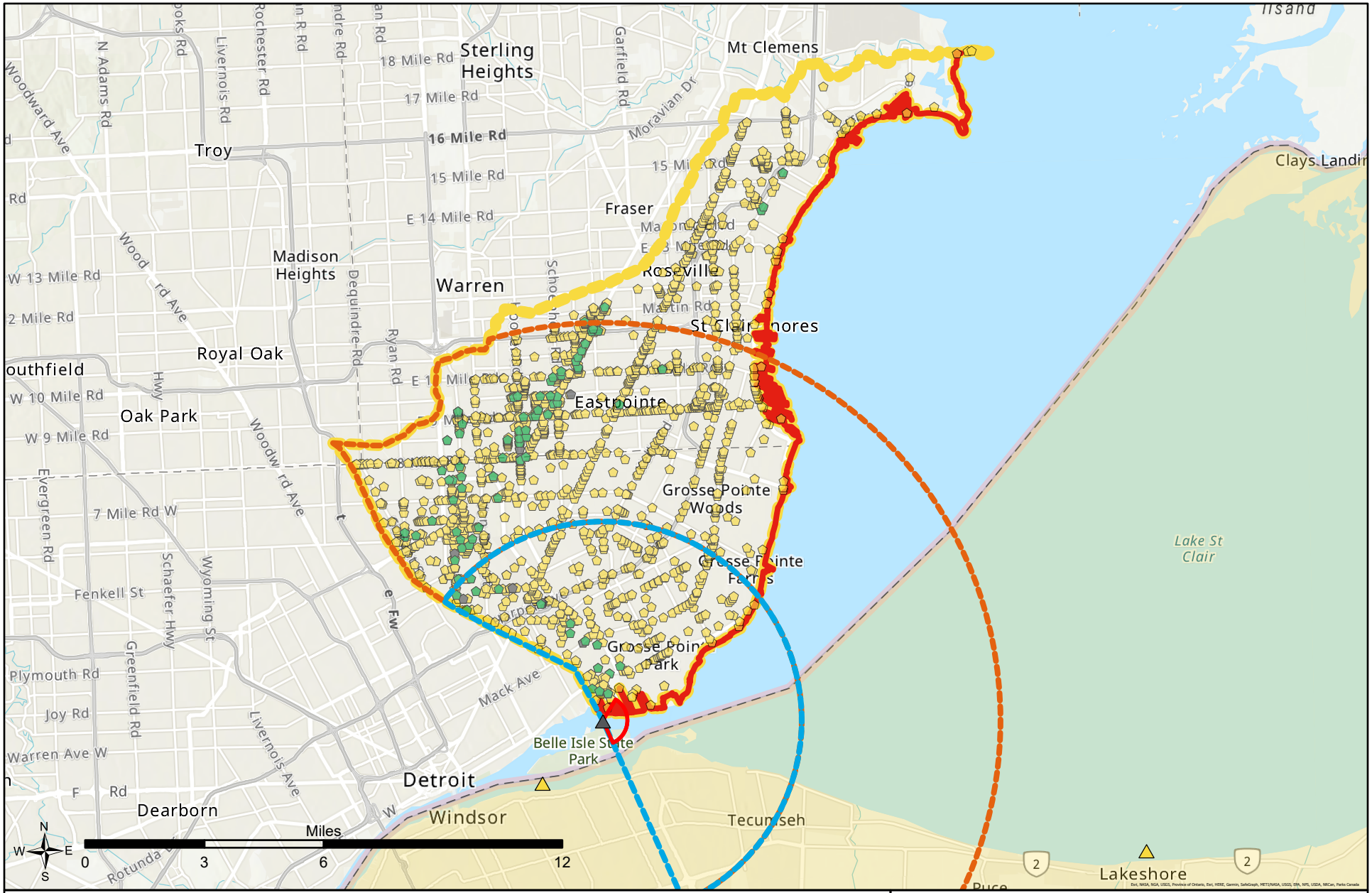
Summary of Foreign and Domestic Traffic on Lake St. Clair (CY 2016-19)				
Commodity	CY2016 tons	CY2017 tons	CY2018 tons	CY2019 tons
20 Petroleum and Petroleum Products	**929,941**	**859,408**	**884,311**	**918,093**
21 Crude Petroleum	0	0	0	0
2100 Crude Petroleum	0	0	0	0
22-29 Petroleum Products	929,941	859,408	884,311	918,093
2211 Gasoline	219,204	271,949	256,283	205,864
2221 Kerosene	0	0	73,611	8
2330 Distillate Fuel Oil	125,431	122,572	61,346	288,862
2340 Residual Fuel Oil	107,075	140,673	40,329	33,547
2350 Lube Oil & Greases	0	265	0	0
2410 Petro. Jelly & Waxes	0	0	0	0
2429 Naptha & Solvents	0	24,803	32,536	4,943
2430 Asphalt, Tar & Pitch	100,830	47,126	94,533	56,725
2540 Petroleum Coke	370,634	252,020	325,673	289,248
2640 Liquid Natural Gas	0	0	0	38,896
2990 Petro. Products NEC	6,767	0	0	0
30 Chemical and Related Products	**296,040**	**179,190**	**225,470**	**87,179**
31 Fertilizers	105,295	46,867	50,472	21,890
3110 Nitrogeneous Fert.	26,729	0	14	0
3120 Phosphatic Fert.	0	0	0	0
3130 Potassic Fert.	78,566	33,639	50,458	21,890
3190 Fert. & Mixes NEC	0	13,228	0	0
32 Other Chemicals and Related Products	190,745	132,323	174,998	65,289
3211 Acrylic Hydrocarbons	3,332	3,488	20,064	0
3212 Benzene & Toluene	16,536	0	0	0
3219 Other Hydrocarbons	0	0	0	0
3220 Alcohols	58,333	59,026	8,442	4,543
3230 Carboxylic Acids	0	0	0	135
3240 Nitrogen Func. Comp.	0	0	0	0
3250 Organo-Inorganic Comp.	0	0	490	0
3260 Organic Comp. NEC	0	0	0	0
3271 Sulphur (Liquid)	0	0	0	0
3272 Sulphuric Acid	0	0	14,572	0
3273 Ammonia	0	0	0	0
3274 Sodium Hydroxide	0	0	0	0
3275 Inorg. Elem., Oxides, & Halogen Salts	192	0	99,285	48,218
3276 Metallic Salts	73,547	69,801	32,144	5,754
3279 Inorganic Chem. NEC	0	0	0	0
3281 Radio active Material	0	0	0	0
3282 Pigments & Paints	0	0	0	0
3283 Coloring Mat. NEC	0	0	0	0
3284 Medicines	0	0	0	0
3285 Perfumes & Cleansers	0	0	0	0
3286 Plastics	0	0	1	6,614
3291 Pesticides	0	0	0	0
3292 Starches, Gluten,	0	0	0	0
3293 Explosives	0	0	0	0
3297 Chemical Additives	38,805	0	0	25
3298 Wood & Resin Chem.	0	0	0	0
3299 Chem Products NEC	0	8	0	0

Source: U.S. Army Corps of Engineers Waterborne Commerce of the United States

Appendix C

Belle Isle Intake Source Water Area Potential Sources of Contamination

Data Retrieved January 2021

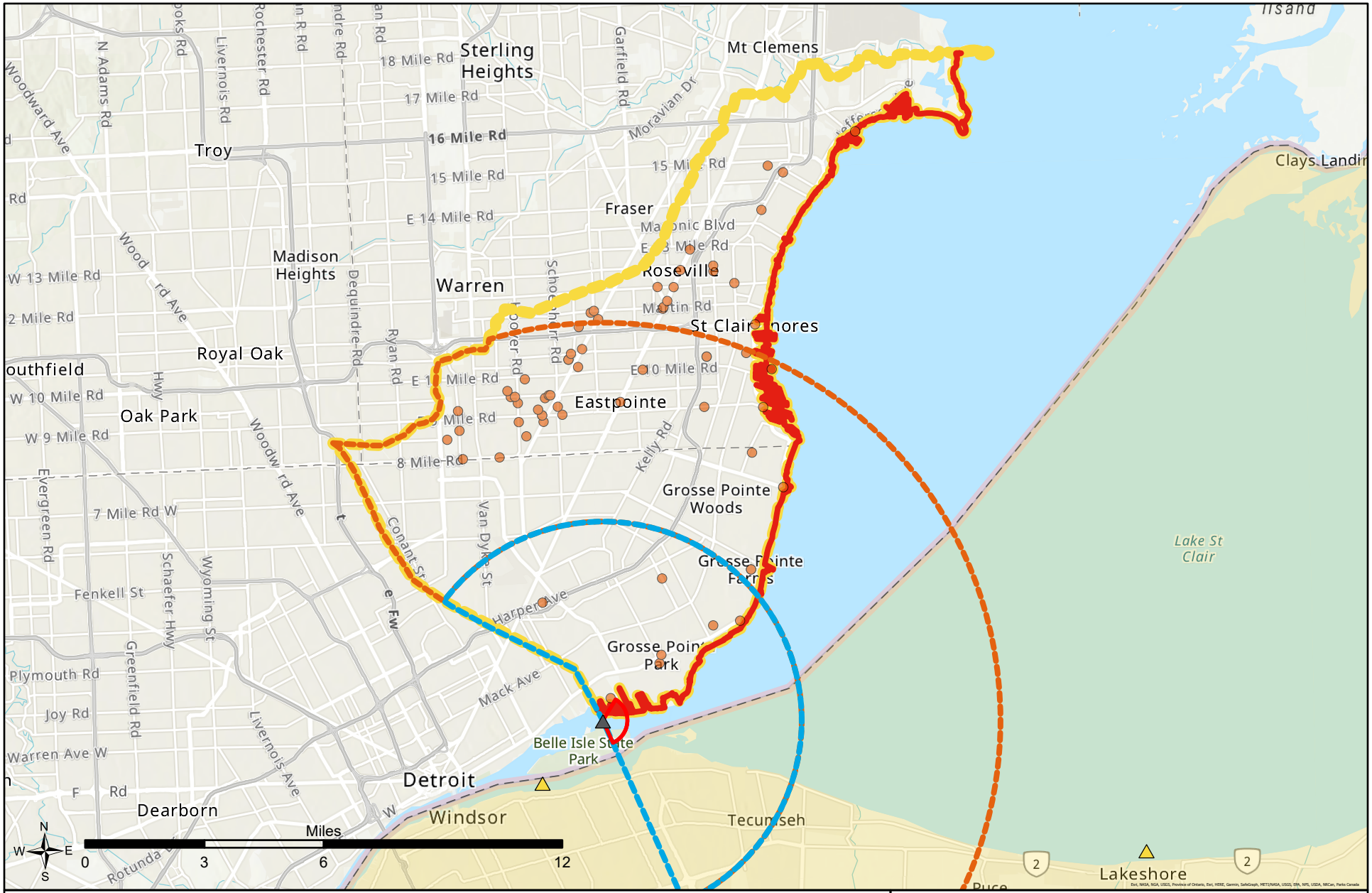


- Belle Isle Intake
- Canada Intake
- RCRA (1,684)
- TRI (91)
- TSCA (17)
- Critical Assessment Zone
- Buffer Zone 1
- Buffer Zone 2
- Susceptibility Zone
- SWA Belle Isle
- St. Clair Watershed

Belle Isle Intake Buffer Zones and Potential Contaminant (Federal Sources)

GLWA Great Lakes Water Authority

ARCADIS Design & Consultancy for natural and built assets

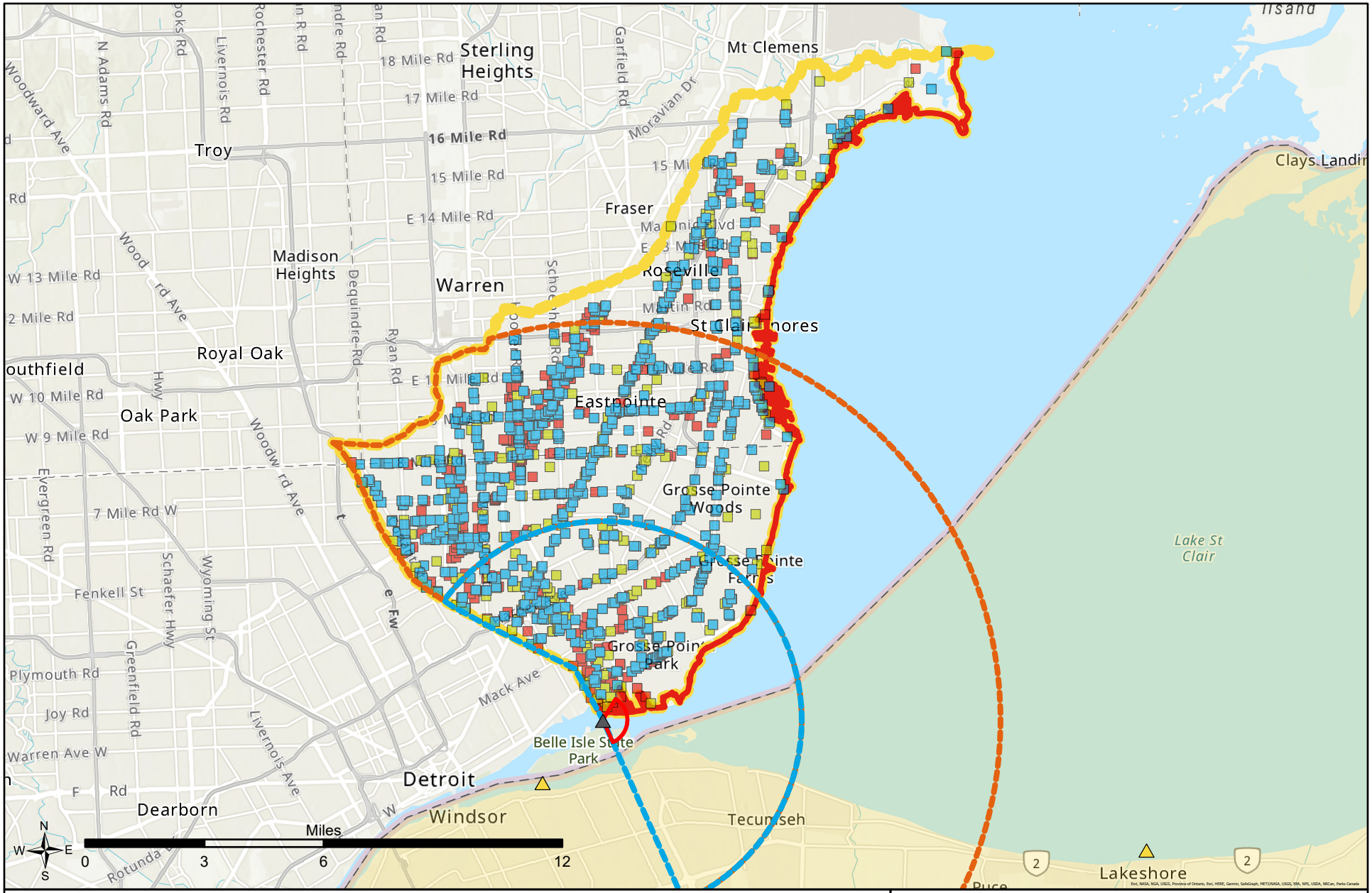


- Belle Isle Intake
- Canada Intake
- NPDES (65)
- Critical Assessment Zone
- Buffer Zone 1
- Buffer Zone 2
- Susceptibility Zone
- SWA Belle Isle
- St. Clair Watershed

Belle Isle Intake Buffer Zones and Potential Contaminant (NPDES Sources)

GLWA Great Lakes Water Authority

ARCADIS Design & Consultancy for natural and built assets



- Belle Isle Intake
- Canada Intake
- PART 201 (397)
- PART 211 (1,044)
- PART 213 (749)
- Critical Assessment Zone
- Buffer Zone 1
- Buffer Zone 2
- Susceptibility Zone
- SWA Belle Isle
- St. Clair Watershed

Belle Isle Intake Buffer Zones and Potential Contaminant (State Sources)

GLWA Great Lakes Water Authority

ARCADIS Design & Consultancy for natural and built assets

Site Name	Type	ID	Latitude	Longitude
GUYTON ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003650219	42.36474	-82.93621
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022924068	42.36474	-82.93621
GOLIGHTLY VOCATIONAL TECHNICAL CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003630857	42.36919	-82.95275
CHRYSLER CORP JEFFERSON ASSEMBLY PLANT S	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001680949	42.3695	-82.96297
US POSTAL SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003704787	42.370261	-82.956362
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064668505	42.370392	-82.954992
PARK PROPERTIES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015842711	42.37041	-82.95479
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045980293	42.37051	-82.95371
COMERICA JEFFERSON PIPER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003680240	42.37129	-82.94822
CHRYSLER JEFFERSON NORTH ASSEMBLY PLANT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000406837	42.3716	-82.9686
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574604	42.372512	-82.94525
CROWN CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653421	42.37264	-82.94496
FOCH MIDDLE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648875	42.373539	-82.978957
PALACE DRY CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015880581	42.37418	-82.94122
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015890981	42.374323	-82.940869
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003609890	42.37449	-82.97958
CHRYSLER CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003608800	42.374588	-82.965014
MARCAT MANUFACTURING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003602842	42.374952	-82.957988
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003714534	42.37501	-82.93919
BANK OF AMERICA NA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066968204	42.375272	-82.93837
JEFFERSON IM PEDS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043413669	42.37556	-82.93764
CITY OF GROSSE POINTE PARK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031271291	42.37584	-82.93738
HOSTEN KARL ESTATE VACANT BLDG	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003637280	42.376088	-82.93679
VINTAGE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003702789	42.37666	-82.93492
VANLOKEREN PROPERTIES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037397643	42.37666	-82.93492
CROWN CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003671447	42.376817	-82.934893
MICHIGAN STATE UNIVERSITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070594822	42.376842	-82.983672
HENRY FORD HEALTH SYSTEM DBA HENRY FORD HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110063758054	42.37718	-82.93378
KROLIK ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003650326	42.37812	-82.99394
PEGGYS CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003655009	42.37842	-82.94872
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015875418	42.37904	-82.99806
CARSTENS SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021891069	42.379201	-82.954682
BUDD COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000847157	42.38005	-82.96882
A AND C COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003638715	42.380162	-82.944008
MR RODGER KERSHNER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064662681	42.38024	-82.91245
US-EPA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110057073161	42.380633	-82.943326
OLD MACK AVE STAMPING PLANT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003580651	42.38087	-82.97579
PRIORITY ONE DEVELOPMENT CENTER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044812263	42.3809	-82.96601
KEITH DAMON ELEM SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021857533	42.38099	-82.98668
ESTATE OF GERALDINE HARDY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044811022	42.38116	-82.93057
FORTY 1 FORTY COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003570582	42.381308	-82.940764
NEW MACK VIPER ASSEMBLY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009393049	42.381529	-82.97459
BEAUMONT HEALTH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070157853	42.381571	-82.913511
ALLEN PRODUCTS CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003699490	42.38159	-82.99626
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058888431	42.38162	-82.93984
K C AUTOMOTIVE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015913305	42.38223	-82.93822
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653975	42.38249	-82.99638
BON SECOURS HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633186	42.382503	-82.937459
REITZLOFF DISPOSAL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003609453	42.38295	-82.973
JOY MIDDLE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044974695	42.383337	-82.985433
CONNER STOP CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006412391	42.383691	-82.967627
IMERMAN INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003580152	42.38383	-82.97063
WILLIAM BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037414116	42.38395	-82.91521
ALTER COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001295580	42.38435	-82.94647
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575202	42.3844	-82.96276
WELLS FARGO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037404626	42.38442	-82.92395
KANE WALTER INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581918	42.384485	-83.010914
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575765	42.384846	-83.010679
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067205562	42.38498	-82.98653
WHITTIER CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067035238	42.38516	-82.94424
RAY A SMITH PAINTING AND DEC INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003585745	42.385333	-82.94375
CHANDLER SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021660013	42.38548	-83.00429
MACK ALTER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020485955	42.38553	-82.94878
GROSSE POINTE CLUB	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003714124	42.3859	-82.89907
DETROIT HOUSING COMMISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015839002	42.38603	-82.96973
STEPHENS SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110036940175	42.386128	-83.013646
JAY FITZGERALD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055526925	42.38618	-82.90906
CERTIFIED PLATING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003598125	42.386415	-82.986186
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064379881	42.386917	-82.950063
CITY OF DETROIT PUBLIC LIGHTING DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037410511	42.38695	-82.95085
RITE AID OF MICHIGAN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066967394	42.38717	-82.9485
U SNAP BAC NPHC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015900453	42.38747	-82.94664
HUTCHINSON ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021634409	42.387572	-82.991258
JUNIOR LEAGUE OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015882124	42.38768	-82.89865
DTE ENERGY ELECTRIC COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017223887	42.38776	-82.97189
CONNER CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003562190	42.38782	-82.97206
CHRYSLER MACK AVENUE ENGINE PLANT COMPLEX	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009395207	42.387983	-82.981838
ATLAS WHOLESALE FOOD CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003595574	42.388267	-82.984469
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573945	42.388403	-82.941399
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003561734	42.388747	-82.984782
DOT SHOEMAKER REHAB CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003647484	42.388767	-82.984795
DAIMLERCHRYSLER CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003710663	42.388807	-82.979452
SPLASH CAR WASH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015802489	42.38887	-83.008021
LARCON LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020477358	42.38887	-82.91822
CITY OF DETROIT ENVIRONMENTAL AFFAIRS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121006	42.38892	-83.019
FIRESTONE SVC CTR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003685450	42.38904	-82.97796
KRAUSMANN SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003703555	42.38935	-82.91832
ANN TAYLOR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037406125	42.38935	-82.91832
C W MUNGO CONTRACTING CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003565776	42.3894	-82.99453
CARCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003600862	42.389427	-82.998329
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015897154	42.38943	-83.00616
YOUNGS CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003602496	42.38944	-83.00117
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015842098	42.38944	-82.98903
MICH DEPT/TRANSPORTATION BRIDGE (PO2-82025)	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121040	42.38952	-82.99016
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653895	42.389581	-82.936082
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067205900	42.38975	-82.95387
GROSSE POINTE SCHOOL SYSTEM	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046439591	42.38989	-82.9016
THE TALBOTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110063381763	42.389926	-82.916746
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003717256	42.38994	-83.02248
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044974686	42.390026	-82.954054
FISHER ROAD PROPERTIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031334223	42.39008	-82.90351
HOSMER ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021864534	42.39035	-82.95844
DETROIT DROP HAMMER BOARD CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579413	42.39037	-82.9856
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979232	42.39044	-82.9153
PARKSIDE HOUSING PROJECT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003568390	42.390703	-82.971983
RED SEA FOOD INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044813565	42.390733	-82.971903
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017870534	42.39082	-83.01414
HENLEY BLUEWATER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003666952	42.39116	-82.9316

Site Name	Type	ID	Latitude	Longitude
NATIONAL PLATING CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003603333	42.39121	-82.980377
GENES LANDSCAPE SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015801792	42.39144	-82.9456
HURRICANE INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016735844	42.391491	-82.986594
DR JAMES FOX - HOME	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044814671	42.39154	-82.89465
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015877899	42.391719	-82.986741
COLIN POWELL ACADEMY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015898493	42.39195	-82.96307
DETROIT HOUSING COMMISSION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015890348	42.392258	-82.973173
VERHEYDEN FUNERAL HOMES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015829665	42.39237	-82.92866
SAMARITAN MANOR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044812334	42.39253	-82.98242
CITY OF DETROIT CHANDLER PARK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564410	42.392694	-82.982704
STATE FARM INSURANCE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015887487	42.392984	-82.921158
VALENTE MENS FORMAL WEAR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039560882	42.39322	-82.92652
DYNAMIC METAL FINISHING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042162539	42.39322	-83.00131
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003593120	42.393471	-83.034834
CLARK SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021891835	42.3935	-82.94188
EQ INDUSTRIAL SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070260535	42.3935	-83.03354
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015805244	42.39352	-83.03261
DYNECOL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000406668	42.39353	-83.03255
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015878674	42.39353	-83.03255
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021873711	42.39356	-83.03044
FLEX-N-GATE DETROIT LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070458664	42.39357	-83.03006
BBH CATERING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044814680	42.39367	-82.89126
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022919626	42.393804	-83.027239
SEVEN STAR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003693726	42.39389	-82.96314
BOB MAXEY LINCOLN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003599106	42.39398	-82.92459
TRENDY AUTO BODY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003627727	42.39449	-82.96145
HOLMES AL ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021883381	42.394564	-83.014901
WAYNE COUNTY COMMUNITY COLLEGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110012611619	42.39459	-82.98565
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664322	42.39459	-82.98565
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003718745	42.39463	-82.92296
STANDARD ON THE HILL 0205	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653467	42.39472	-82.90378
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003577273	42.394747	-82.960747
DUCKS HAND CAR WASH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003697401	42.39511	-82.95975
PVS TECH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000406784	42.395228	-82.996228
EMMET COATING SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031367562	42.395228	-82.996228
AUTO RESTYLING & CUSTOMIZING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003605974	42.39536	-82.95904
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031326786	42.39542	-82.92171
PERRY DRUG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066971156	42.39544	-82.90276
MET-L-AID INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001841632	42.395526	-82.989486
PVS STEEL SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110014322410	42.39556	-82.99536
CONSOLIDATED RAIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020477759	42.39556	-82.99536
RICCI JOE JEEP EAGLE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003657061	42.39591	-82.92133
TIGERS AND LIONS STADIUM PARKING AREA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003709648	42.39593	-82.90737
PVS TRANSPORTATION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009597034	42.39602	-82.99365
HENRY FORD HEALTH SYSTEM DBA HENRY FORD HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055526131	42.39614	-82.90186
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058888048	42.39614	-82.90186
PVS CHEMICALS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003692950	42.39624	-82.99849
STEEL RULE DIE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009599513	42.39627	-82.99851
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031436621	42.39644	-83.01325
THE ECONOMIC DEVELOPMENT CORP. OF THE CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110069511727	42.39646	-83.03754
AMERICAN GOLF CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020898439	42.39647	-82.97301
KERRY STEEL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022926565	42.39649	-82.99218
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037412902	42.396642	-82.944586
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007578219	42.39678	-82.95515
HENRY FORD MEDICAL CENTER-COTTAGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015903922	42.39688	-82.9013
CAFANA CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003570859	42.39695	-82.92059
DOLLAR EXPRESS STORES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064016602	42.397007	-83.002618
MICHIGAN FOUNDATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001679407	42.39702	-82.999
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564438	42.39709	-82.95599
INDUSTRIAL CONTAINER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054842998	42.39723	-82.99911
US POSTAL SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015828933	42.39738	-83.00239
CITY OF DETROIT RECREATIONAL DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564401	42.39753	-83.0368
CHRYSLER CORP HUBER AVE FOUNDRY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575970	42.39757	-83.03428
DETROIT WATER AND SEWERAGE - CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009599924	42.39757	-83.03428
HUBER MANCHESTER INVESTMENTS LC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017617792	42.39761	-83.03209
RIZZO ENVIRONMENTAL SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664377	42.39761	-83.03209
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003717265	42.39767	-82.95272
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037414081	42.39779	-83.00969
OJ TRANSPORT CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003599044	42.398	-83.00198
ZEPPLIN CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587477	42.39801	-83.00197
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064381128	42.39817	-82.95134
DETROIT INDUSTRIAL PROCESS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003684718	42.39819	-82.99916
HAMILTON ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648919	42.3982	-82.96254
STAPLES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066971619	42.39823	-82.91951
WYANDOTTE PAINT PRODUCTS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581507	42.398363	-82.997583
ONE HOUR MARTINIZING OF POINTE LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573963	42.39839	-82.91939
VAN AND SON COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587413	42.398685	-82.919346
MASCOTECH SPECIAL VEHICLES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003645093	42.399	-83.03763
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015325236	42.39907	-82.99821
METRO TIRE EXPRESS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575220	42.39926	-83.02293
MACOMB SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021872348	42.39962	-82.984598
MI DEPT/ENVIRONMENTAL QUALITY RRD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003717247	42.399671	-83.025022
AIRPORT COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003681463	42.39992	-83.00071
COLUMBIA TOOL AND DIE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003567499	42.4002	-83.01327
DETROIT FORGE & FNDY.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009596375	42.400275	-83.027972
CITY AVIATION SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007594406	42.40036	-83.00041
C AND S AUTO RPR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003674630	42.40051	-82.94496
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015877693	42.40053	-82.97859
GRATIOT COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003615160	42.40055	-83.000605
AMBASSADOR BRIDGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007595021	42.40069	-82.92625
IVAN DOVERSPIKE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003576096	42.40083	-82.99291
TRI MARK METALS CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003651343	42.400868	-83.020089
SHELLER-GLOBE CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003606321	42.40093	-83.0171
MICHIGAN CHROME & CHEMICAL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000700741	42.40094	-83.01679
G20 ENERGY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056512732	42.40101	-83.01477
ADVANCE STEEL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003701682	42.4011	-83.00117
R P SCHERER CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001299014	42.40113	-83.01144
DETROIT TESTING MACHINE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581865	42.40114	-83.01126
DETROIT PUBLIC LIGHTING DEPT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003643004	42.40118	-83.00995
MOTOR CITY ELECTRIC CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015842105	42.40118	-83.01003
U S A TRUCK INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016719559	42.40119	-83.03773
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037415632	42.40119	-83.03859
CORVER ENG CLINTON CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003630223	42.4012	-83.00947
GAYA INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003598697	42.40122	-82.94303
SUN OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015842070	42.40122	-83.02301
BURNS FABRICATING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003605885	42.40124	-83.00822
PURVIS & FOSTER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031441973	42.40125	-83.0079
TFM LLC (TRIMARK)	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003600871	42.40138	-83.00331

Site Name	Type	ID	Latitude	Longitude
RAY LAETHEM PONTIAC BUICK GMC TRUCK INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003594806	42.40145	-82.91788
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003717210	42.40151	-82.97528
PREFERRED FILTER RECYCLING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042023244	42.40163	-82.99964
RELIABLE ARCHITECTURAL METALS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003569718	42.4017	-83.01801
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022479263	42.40193	-82.96573
GREATER ROCK OF AGES CHURCH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003700558	42.40197	-82.99401
ECLIPSE TECHNOLOGY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003687635	42.402083	-82.940677
MCGUIRE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003689786	42.40216	-82.94045
HARPER AND DICKERSON MOBIL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636478	42.4022	-82.97299
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573099	42.40232	-82.97258
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044974285	42.402422	-83.037755
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979081	42.402549	-82.999051
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003651405	42.40292	-82.917
HAMMERTIME HARDWARE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003707230	42.40299	-82.93821
NIAGARA CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003643111	42.402993	-82.93821
RED BOW TIE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016726550	42.40307	-82.93801
CITY OF DETROIT PUBLIC LIGHTING DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037400149	42.403458	-82.995602
CONRAIL NORTH YARD CAR SHOP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003577415	42.403497	-83.037675
PROGRESSIVE DISTRIBUTION CENTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024443770	42.403572	-83.037794
ITOCHU CHEMICALS AMERICA INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037402343	42.403572	-83.037794
MACDERMID INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070432865	42.403572	-83.037794
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021882266	42.40382	-82.91774
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003669405	42.403893	-82.964335
CENTRAL VACUUM	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006516172	42.40394	-82.92839
THE SHERWIN WILLIAMS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604056	42.40404	-82.93531
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015806225	42.40404	-83.01832
QUI KE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003642130	42.40421	-82.93485
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064663939	42.40436	-82.9656
WASTE MGMT DETROIT RECYCLING CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015888315	42.40475	-83.03738
DTE ELECTRIC COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002118002	42.40477	-83.0362
MI DEPT/TRANSPORTATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007586264	42.40477	-83.037646
CROWN GROUP, LYNCH ROAD PLANT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110011585301	42.40477	-83.03651
GOODWILLS GREEN WORKS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110040448584	42.40477	-83.0362
PROGRESSIVE DISTRIBUTION CENTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003702556	42.404788	-83.035257
INTERNATIONAL TRANSMISSION COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016729021	42.40485	-83.04391
US EPA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070157906	42.40485	-83.04391
CHRYSLER CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003609471	42.40486	-83.03191
DAIMLERCHRYSLER CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003628539	42.40486	-83.03235
TRUMACK ASSEMBLY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009395788	42.40486	-83.03235
CHRYSLER LLC - DETROIT AXLE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000407104	42.40488	-83.03037
RAY LAETHEM CHRYSLER DODGE JEEP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054838146	42.40496	-82.91611
CAPITAL WRECKING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015883622	42.40504	-83.02107
MOTOR CITY ELECTRIC CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003687172	42.40509	-83.01946
CONNER SVC CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003680428	42.40525	-82.99726
BETHANY LUTHERAN CHURCH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110011839733	42.40548	-82.94841
SPEEDWASH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037403235	42.40561	-82.96135
BROWN, RONALD ACADEMY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110036940166	42.40565	-82.94743
BRYANS BUMPING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003619825	42.40573	-82.96514
SHELL OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003649936	42.40578	-82.96077
RITE AID OF MICHIGAN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054841249	42.40582	-82.9969
MARATHON PETROLEUM COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003627237	42.405839	-82.930431
FCA TRANSPORT LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003605625	42.40604	-83.01283
POINTE ENVIRONMENTAL SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007579824	42.40604	-82.89173
TRUSTAR ENERGY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067205152	42.40604	-83.01283
WEST COOPERAGE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003580250	42.406234	-83.041276
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044941490	42.406235	-82.996184
ALLIED MFG TECH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003558579	42.40624	-83.04108
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564367	42.40624	-83.04074
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574560	42.40627	-82.99926
GROSSE POINTE FARMS DPS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003714133	42.40638	-82.89257
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064380272	42.40695	-82.92744
ELMDALE FINE & PROFORMING ARTS CONSERVATORY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015902184	42.40697	-82.97754
KNOCKERS COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031405931	42.4071	-83.02322
AIR EAGLE LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003668843	42.40737	-83.00067
M & M HARDWARE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015851292	42.40752	-82.92584
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015791758	42.40755	-82.95447
ADVANCE AUTO PARTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031373163	42.40768	-82.9254
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015834070	42.40786	-82.97992
LASKOS COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042279539	42.40791	-82.95287
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020890053	42.40804	-82.92438
LYNCH SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021646209	42.408175	-83.024769
CHILDERS PRINT AND GRAPHICS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003714437	42.40822	-82.95151
CENTRAL MAINTENANCE SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607776	42.40826	-83.04299
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653984	42.40827	-82.99527
PREFERRED CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587235	42.4083	-82.91434
MARK ELMER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054838477	42.40833	-82.9145
MICROPHOTO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000856823	42.40857	-83.03951
DTE GAS COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015880144	42.40866	-83.00887
GOODALE ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003650237	42.408668	-82.977139
CONRAIL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022478736	42.408826	-83.038022
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020576811	42.409	-83.03817
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564349	42.40921	-82.99468
LOCHMOOR CHRYSLER JEEP INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003592853	42.40933	-82.91404
FINNEY HIGH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003645280	42.41007	-82.93014
FOREST LAWN CEMETERY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003670304	42.41044	-83.02333
ARCHDIOCESE OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022480082	42.410749	-82.968346
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021897722	42.410863	-82.941261
YONG UPPER MACK CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003645164	42.41088	-82.91314
F N PETROLEUM	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037416604	42.41107	-83.005445
A-1 DRY CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044974267	42.41131	-82.94389
CHARLES TERRACE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003697704	42.411425	-83.047416
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015876140	42.411425	-83.047416
PINSTRIPING BY SLICK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003630928	42.41144	-82.99322
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064662716	42.41168	-82.9434
MACK & CONNER ASSOC LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017871132	42.41169	-82.91297
WHITE ELEM SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021728914	42.411698	-83.050274
COLLOIDAL PAINT PRODUCTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009291827	42.41196	-83.03933
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015874883	42.41196	-83.03933
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045978000	42.41214	-82.91331
H B FULLER CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003686208	42.41236	-83.03814
DETROIT COUNTRY CLUB	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015885817	42.41245	-82.89289
AUTO CITY COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003645208	42.41297	-83.02344
CORTNEY GLASS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003709452	42.41306	-82.94154
GROSSE POINTE FARMS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003675746	42.413133	-82.90752
DOMINICAN HIGH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633523	42.41337	-82.94838
MR CS CAR WASH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043191970	42.413492	-82.912172
P KOWALSKI INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587093	42.41368	-82.94072
SWIFT ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003683121	42.413686	-82.886761

Site Name	Type	ID	Latitude	Longitude
MICH I LEASE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003654901	42.41399	-83.03282
MICKOWSKI TERRY BUICK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587299	42.414	-82.94029
COLLISION CRAFTSMEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003702173	42.41409	-82.99148
MOTOR CITY BRAKE & REPAIR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042162600	42.41414	-82.97053
MT ELLIOT STEEL PRODUCTS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110018896587	42.41415	-83.03816
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037398893	42.41425	-82.94237
SHELL OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003670448	42.41433	-82.99132
COUNTRY CLUB OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003668406	42.41445	-82.89437
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648410	42.4146	-82.91167
CLEVELAND SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648786	42.414722	-83.060934
SANDERS CLEANING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003618808	42.414758	-82.911598
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037402110	42.4148	-82.9648
BIG DUDE & FA CAR WASH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003692308	42.41487	-82.94805
CHEMICAL TECHNOLOGY FIRE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066970665	42.41487	-83.03818
GREAT LAKES ELECTRICAL SIGN COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021011242	42.41488	-83.03215
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003712670	42.41495	-83.03425
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016735130	42.41503	-83.03204
ANGOTTS DRAPERY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003598143	42.41506	-82.94851
CNL APF PARTNERS LP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377754	42.41509	-82.99083
GERRYS PAINT WORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003640098	42.41517	-82.97116
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022920053	42.41544	-83.02497
B & Y ESQUIRE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003586995	42.41554	-82.9648
GREAT LAKES VACUUM SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887548	42.41557	-83.03164
KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037403823	42.41567	-82.91091
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007576097	42.415693	-83.061027
DETROIT CITY OF	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564045	42.41571	-83.06106
JACK C HERMES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003644414	42.41573	-82.95013
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015895735	42.41596	-82.99025
SAFEWAY TRANSPORTATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003711314	42.41603	-83.06179
WAYNE ELEM SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021728638	42.416073	-82.955842
USEPA SITE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016723713	42.416158	-83.031209
CASSENS TRANSPORT CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607954	42.41625	-83.02664
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003655777	42.41625	-82.93701
METAL AND WELDING INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604172	42.41628	-83.03112
EQUITABLE METALS CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003591676	42.41639	-83.05919
SHELL OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584480	42.41646	-82.93661
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653485	42.41653	-82.93643
MAACO AUTO PAINTING & BODYWORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003624971	42.41655	-82.98986
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575747	42.41662	-82.9362
NATIONAL CHURCH FURNITURE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597803	42.41695	-83.0577
JACK C HERMES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003626693	42.41702	-82.95328
LYNCH ANNEX SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003650086	42.417028	-83.022283
APEX DRUG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054842300	42.41703	-82.93538
CARCRAFTERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003637066	42.41707	-82.98952
CADILLAC OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000406711	42.41709	-83.03089
GENERAL DYE CASTING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003585861	42.41712	-83.03825
US ENVIRONMENTAL PROTECTION AGENCY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015884257	42.41712	-83.03825
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015816740	42.417128	-83.057232
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003660379	42.41724	-82.91049
WALGREEN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377362	42.41734	-82.91176
APEX DRUG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054838654	42.41761	-82.91186
LAKEPOINTE COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003605965	42.41764	-82.95473
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575266	42.41774	-82.96489
EAST SIDE VASCULAR ACCESS CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044812913	42.41789	-82.9125
DYNAMIC AUTO BODY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015897966	42.41795	-83.05509
MEYER CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003561592	42.41799	-82.97302
SERVICE STEEL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377825	42.418	-83.03289
ONE HOUR MARTINIZING OF GROSSE POINTE LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003606820	42.41805	-82.91037
RDC GRAPHICS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597849	42.418157	-82.955995
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648866	42.41843	-82.9415
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003659540	42.41858	-82.98854
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020896235	42.41862	-82.98851
DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044810871	42.41867	-83.06414
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573142	42.41869	-83.06272
RYAN AUTO CENTER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015802504	42.41869	-83.06205
BOBS BUMPING & PAINTING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003689134	42.41872	-83.02367
SAMSON ASSOCIATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607455	42.4189	-83.05094
ALLIED TOWING SERVICE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003569674	42.41894	-83.04979
DETROIT EDISON CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003576835	42.41897	-83.0131
ASCENSION ST. JOHN HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003603413	42.41897	-82.91492
TOTAL CAR CARE CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006517019	42.41907	-83.02368
SIX AND MOUND TRANSMISSION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003622508	42.41909	-83.04203
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574542	42.4191	-82.95826
KNIGHT ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007583481	42.419109	-83.039029
G AND A MACHINERY SALES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003615525	42.41911	-83.0414
DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070120989	42.41915	-83.03878
PERFECTION COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003606722	42.41919	-82.93844
TWH METALS CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064379943	42.419222	-83.036004
RIM CUSTOM RACKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000406775	42.41924	-83.03521
6556 MC NICHOLS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581589	42.41927	-83.03428
FAIRMONT SIGN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003609015	42.419325	-83.032109
AMERICAN STEEL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000779890	42.41938	-83.02936
MOUHAJER ENTERPRISES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573080	42.41952	-83.02369
DJS AUTO CTR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003596966	42.419559	-82.987893
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573847	42.419673	-82.98782
WILKINS SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021729085	42.41984	-82.99511
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015875212	42.41985	-83.00838
MARQUETTE ELEM SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021872525	42.41988	-82.9217
ALLSTAR COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003568728	42.4199	-83.00663
EASY OIL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024437448	42.42018	-82.97445
AUREUS HOLDINGS LTD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015849126	42.420392	-83.038373
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564116	42.420406	-82.985716
RAMPART INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001130133	42.420445	-83.062554
DIH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003578101	42.420526	-83.048319
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066970852	42.42054	-82.96499
AMERITECH CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003616301	42.42061	-83.02372
ROYAL CENTERLESS GRINDING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066970521	42.4207	-82.97165
LOU'S BODY SHOP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003570957	42.42076	-82.967031
FAST CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003655018	42.42076	-82.96627
INTL MNRL & CHEM CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003603707	42.420817	-83.061223
LEAR CORP DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000406766	42.42091	-83.05707
PLATING EQUIPMENT USEPA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607188	42.42093	-83.04176
GLOBAL SPECIALTY PRODUCTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044975417	42.42093	-83.05597
SKYLINE PAINTING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003696108	42.42102	-83.03349
LENS CRAFTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037405643	42.421215	-82.910297
LAMONT STREET - DEQ/RD - EPA CLEANUP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045977181	42.42131	-83.05388
SARAN PROTECTIVE COATINGS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003634274	42.42139	-83.05934
SNAPPY HI TECH INDUSTRIAL SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015805529	42.42148	-82.97447

Site Name	Type	ID	Latitude	Longitude
SPARTON CORP ALLIED STEEL & CONVEYORS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003577031	42.42155	-83.05493
AABCO WASTE OIL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003718638	42.42168	-83.03976
AUTOMOTIVE CHEMICAL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597073	42.421771	-83.0657
CAPITOL MFG CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003614688	42.42178	-83.04504
ALPHA RESINS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056954434	42.42183	-83.06259
CITY OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067206990	42.421966	-83.001651
BREWER ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021660638	42.42199	-82.96506
FITZGERALD FINISHING LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000494037	42.42206	-83.03707
ROMIN IRON & METAL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067417236	42.4221	-83.06592
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015838628	42.42223	-83.00656
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564161	42.422289	-83.038442
EUTECTIC ENGINEERING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044976050	42.422465	-83.037083
DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044817696	42.42247	-82.93346
CADILLAC ENAMELING WORKS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001299121	42.42254	-83.03357
EPOXI TECH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015821459	42.422558	-83.041832
EASTLAND COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003624472	42.42267	-82.9964
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015847985	42.42272	-83.02698
SOLO CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587324	42.422901	-83.0665
DETROIT FIRE DEPT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070432849	42.42295	-82.96186
SUPERSINE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579440	42.42298	-83.04185
MI DEPT/CORRECTIONS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003670929	42.42318	-83.06262
MORANG CLINIC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604127	42.42323	-82.94293
INTEGRATED MANUFACTURING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039529196	42.42334	-83.03526
CITY OF DETROIT/FIRE DEPT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043310994	42.423418	-82.943396
ZERO CRAFT CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581785	42.42344	-83.03093
B AND J ENAMELING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054838413	42.42344	-83.03105
MICHIGAN INDUSTRIAL SERVICE CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003598241	42.42346	-83.02992
HART AUTO WORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636940	42.42346	-82.98535
WOLVERINE TOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003665588	42.42351	-83.02748
JO MAR ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001845503	42.423527	-83.026873
PRECISION STEEL TREATING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003645878	42.423531	-83.038492
HOOVER TREATED WOOD PRODUCTS, INC.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000406720	42.42355	-83.02612
MORANG DRY CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003620822	42.4238	-82.94432
CITY OF DETROIT/FIRE DEPT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038868339	42.42404	-82.98718
MAAT IMHOTEP TECHNICAL ACADEMY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003649758	42.42419	-82.9798
UNIVERSITY LIGGETT SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003690257	42.42426	-82.89989
NORTOWN COMMUNITY DEVELOPMENT CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031414636	42.42435	-83.03853
NORTHWESTERN PRINTING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003565259	42.42441	-83.06264
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573106	42.42476	-82.99056
DRUMMY OLDSMOBILE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003623455	42.42477	-82.99052
COLLISION CRAFTSMEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003678958	42.42506	-82.989721
US DEPT/DEFENSE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003559015	42.42523	-83.03366
CITY OF DETROIT/FIRE DEPT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042165876	42.425377	-83.039932
BIG SALAD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044818926	42.425557	-82.909832
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046529869	42.425796	-82.927131
MONTEITH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021659463	42.42583	-82.90369
AMERICAL DBA DINVERNO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003601399	42.42604	-83.05603
MASTER METALS INCORPORATION #2	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003592764	42.426045	-83.055463
CADILLAC COFFEE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579020	42.42605	-83.05486
SOVA/JUDD INDUSTRIAL CONTRACTORS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003677316	42.42606	-83.05411
WASH BLOUNT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008449278	42.42608	-83.05301
CITY OF DETROIT POLICE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564036	42.42611	-83.05166
MANAL PETRO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043548961	42.42614	-83.068825
SPARTAN METAL FINISHING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002454647	42.42617	-83.04904
AJAX MATERIALS CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001830163	42.42624	-83.04568
MERCURY GAGE CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003637878	42.42626	-83.04502
FRANKS NURSERY & CRAFTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110030596460	42.426441	-83.0372
DETROIT DPW DEMOLITION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003717620	42.42647	-83.04346
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015794513	42.426472	-83.035948
INTEGRATED MANUFACTURING & ASSEMBLY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046438985	42.426472	-83.035948
SPARTAN PLATING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110028194807	42.42651	-83.03398
INDUSTRIAL SMELTING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003717835	42.42652	-83.03352
CORNER STONE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017870963	42.4266	-83.03022
CARLETON SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021730750	42.42675	-82.94594
DENNIS BODY SHOP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003613698	42.4268	-83.038635
DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070516239	42.42682	-82.98477
MT OLIVET CEMETERY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003560520	42.427001	-83.013266
PAN GLO OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001299087	42.4271	-83.03321
DENBY HIGH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648624	42.42736	-82.95853
NEW CENTER COATINGS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015822136	42.42736	-83.03321
GERALDINE M HARDY MD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044821100	42.4274	-82.90959
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003718754	42.42769	-82.9841
SPEEDWAY SUPERAMERICA LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646699	42.42776	-82.90955
WUMMEL COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003641024	42.42788	-82.9747
KUALITY KAR KARE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003671991	42.42791	-82.95436
ST CLAIR CLEANERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003689768	42.42799	-82.98233
TRINITY CATHOLIC HIGH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015913378	42.42814	-82.92549
E Z 49 MINUTE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003612323	42.42829	-82.955291
CRYSTAL CLEANERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006413121	42.42833	-82.95538
GROSSE POINTE SERVICE CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003562895	42.42835	-82.9092
LIBERTY BURNISHING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003710119	42.42865	-83.03326
DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648802	42.42869	-82.96287
GRANT MIDDLE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648884	42.428704	-83.024168
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575738	42.42882	-82.9566
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064667677	42.42882	-82.9566
GERRYS PAINT WORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633113	42.429	-82.97464
DEFOSS GRINDING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003612564	42.42913	-83.03329
MODERN WAY CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003562056	42.429179	-83.062863
EUGENIO PAINTING COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067551429	42.42921	-82.90932
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003717238	42.42937	-82.98489
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015809080	42.42937	-82.95764
D2 ABATEMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022480242	42.42965	-82.94062
ATKINSON ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021883489	42.4297	-83.05408
PTI ASSEMBLY & MACHINING LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044820548	42.43008	-83.03764
CSP LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581099	42.4301	-83.03679
J AND N CONVERSIONS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003628165	42.430263	-83.038788
JUSTICE TRUCKING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607240	42.43027	-83.04802
STERLING COLLISION CENTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003626265	42.4304	-82.92401
SHERWOOD FOODS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003569380	42.4307	-83.03391
RYDER TRANSPORTATION SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003701520	42.4307	-83.03391
FLEMING ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021648010	42.430887	-82.994691
VON STEUBEN MIDDLE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003609916	42.43095	-82.99956
NORTOWN CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003561299	42.43134	-83.02414
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636227	42.431537	-83.063008
ALRO STEEL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046259286	42.43177	-83.03395
DETROIT COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003620449	42.43191	-83.02415
GOULBURN MERCURY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110013801298	42.432	-82.99349
JUSTICE TRUCKING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003635610	42.43219	-83.00703

Site Name	Type	ID	Latitude	Longitude
SYBILS CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003621643	42.432373	-83.073245
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003627200	42.432402	-83.063061
DETROIT EDISON CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009396368	42.432402	-83.063061
TWO ACE CLEANERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007586647	42.43292	-83.074107
QDW CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015831821	42.43292	-83.07364
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007578790	42.43311	-83.06311
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007597109	42.43313	-83.06263
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017618229	42.43335	-82.97881
ONE STOP GAS & GO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008440883	42.43336	-83.05293
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573400	42.43342	-82.908575
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037405536	42.433523	-83.045825
HNS MINI MART	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015875301	42.43353	-83.04555
VACANT LOT AT 5847 E 7 MILE RD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007594120	42.43356	-83.04416
BANKAS COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444692	42.4336	-83.04196
DIAMOND GLO AUTO WASH LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055060749	42.43365	-83.03924
DURAKO PAINT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443611	42.43368	-83.03832
CROWN GROUP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064164933	42.43368	-83.03844
K & S INDUSTRIAL ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066970139	42.43371	-83.03666
CAR CRAFTERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008455616	42.43387	-83.02925
PIC N SAVE SUPER MARKET	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015794309	42.43389	-83.02838
GAROFALO CNRS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008439118	42.43392	-83.02732
U HAUL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007583702	42.434	-83.02275
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031304657	42.43402	-83.022046
WASTE FREE LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044817598	42.4341	-83.01738
U-METCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042281134	42.43413	-83.0165
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064663840	42.434146	-83.015728
SAN MARINO IRON CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007583178	42.43426	-83.01165
HENRYS CLEANERS OF GROSSE POINTE WOODS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003608604	42.43429	-82.90846
CRUMPS CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007578576	42.43438	-83.00783
OSBORN HIGH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020849974	42.43444	-83.00466
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008441203	42.434442	-83.004128
MORROSS & KELLY SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003651432	42.43449	-82.95246
AHEE EDMUND T JEWELRY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003586806	42.43456	-82.90843
PEARCE BOILER & ENGINEERING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003584997	42.43467	-83.01437
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020893336	42.43467	-82.95296
PEACE FUNERAL HOME INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070207280	42.43468	-82.99639
G A P SERVICE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007585899	42.43471	-82.99543
REVERE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008453137	42.43476	-82.99282
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110023049654	42.43477	-82.95355
MEHDI GAS MART INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007590945	42.43481	-82.99024
JENNINGS PUMP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001680226	42.43483	-83.03896
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979722	42.43493	-82.98511
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017870810	42.43498	-82.98241
SEVEN MADDELEIN LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015820469	42.43504	-82.97934
PARK METAL PRODUCTS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001301127	42.43523	-83.03407
GROSSE POINTE YACHT CLUB	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044974873	42.4353	-82.87601
SAM'S COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448965	42.435339	-82.968911
LOCHMOOR CLUB	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003602691	42.43544	-82.89425
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008442266	42.43545	-82.96493
GLOBAL TITANIUM INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031331510	42.43546	-83.03781
PERMAWICK CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003685405	42.4355	-83.01443
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664402	42.43553	-82.9774
NORBROOK PLATING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581892	42.43559	-83.03899
CHARTER DEVELOPMENT COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044814519	42.43563	-82.95703
DONALD F GARANT RESIDENCE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121136	42.43574	-82.98403
PERCH MACHINING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003631856	42.43593	-83.03783
VILLAGE OF GROSSE POINTE SHORE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007597458	42.43615	-82.87602
GLOBAL TITANIUM INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031431270	42.43615	-83.03783
ASTRO COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003655116	42.4362	-83.03901
LAPPIN PROPERTY COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022477265	42.43623	-83.01267
TRAVERSE GROUP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016731198	42.436248	-83.012006
DETROIT RECYCLING & TRANSFER STATION LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003674836	42.43627	-83.01124
MEIER SCREW PRODUCTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003580599	42.436382	-83.03411
TRANOR INDUSTRIES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042156136	42.43641	-83.03411
GLOBAL TITANIUM	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003611057	42.43647	-83.03784
AAPLE FABRICATING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003585086	42.43653	-83.03902
PERCVISION PLASTICS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003625239	42.4367	-83.03903
THE SHERWIN-WILLIAMS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604047	42.436808	-82.976552
RICHARD SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021633080	42.437026	-82.982414
WORLD CONSOLIDATED INCORPORATED	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024551108	42.43711	-83.07667
GLOBAL TITANIUM	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045450169	42.43747	-83.03906
HOLLYWOOD CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003621019	42.43776	-82.9505
MICHIGAN CAREER INSTITUTE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003622697	42.4378	-82.97589
PGP CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000407140	42.43795	-83.03417
JACK C HERMES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587057	42.437952	-82.920133
LAW ELEMENTARY SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003650139	42.437983	-83.030853
DOWNRIVER MAINTENANCE CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015883604	42.4385	-83.01068
MARATHON PETROLEUM COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007579806	42.43855	-82.87576
MICHIGAN AUTOMOTIVE SPECIALISTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001849527	42.43858	-82.97538
MASON PUBLIC SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021872721	42.43891	-83.07251
KROGER #0454-018	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037401406	42.43916	-82.90759
CREATIVE MFG SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003634988	42.439467	-83.050431
CURTOS SVC CTR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003668460	42.43952	-82.91944
DUNN RITE AUTO SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015876774	42.43952	-82.89003
VAN DYKE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003571359	42.43985	-83.02442
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979241	42.43985	-82.90749
BIRKS WORKS ENVIRONMENTAL LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016734373	42.44003	-83.03915
CONSUMERS ENERGY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037407507	42.44003	-83.03915
HART AUTO WORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003660324	42.44015	-82.974348
ONE HOUR MARTINIZING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003619004	42.44026	-82.90769
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564624	42.4403	-83.00491
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664652	42.44042	-83.04402
PULASKI SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003649080	42.440454	-82.998738
ADNAN NASSAR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037404733	42.44051	-83.03917
BENZ INCORPORATED	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003694734	42.44056	-83.0521
ULTRA AIR PRODUCTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003613233	42.44059	-83.05076
VAN ZILE ELEM SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021729469	42.44069	-83.05472
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573017	42.44078	-83.02445
FAIRMONT SIGN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003663811	42.44091	-83.0386
FLUID ROUTING SOLUTIONS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000407113	42.44094	-83.03846
CYCLOIDAL CORP OF AMERICA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003616249	42.44097	-83.03697
DAIMLERCHRYSLER MT ELLIOTT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000407239	42.440983	-83.04028
KMART CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003667933	42.441	-83.03551
PENSKE AUTO CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003693094	42.441	-83.03551
ROSE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003701780	42.44102	-82.90756
FARWELL MIDDLE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648857	42.44124	-83.053691
NEW FORTY MINUTES CLEANER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015842016	42.44129	-82.9736
ST JOHN NORTH EAST COMMUNITY HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604537	42.44132	-83.02026

Site Name	Type	ID	Latitude	Longitude
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007578834	42.44133	-83.02446
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045978493	42.44133	-83.02446
CONANT 7 AUTO SUPPLY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003658373	42.44137	-83.079733
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045977813	42.44142	-82.94776
E I DUPONT DE NEMOURS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003600434	42.44151	-83.01826
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003626158	42.44155	-83.01436
14534 TACOMA ST	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003707935	42.441671	-82.973229
SEVEN TO SEVEN CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003622866	42.441965	-82.94735
FCA US CONNER AVENUE ASSEMBLY PLANT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009395387	42.442019	-83.018566
SAMUEL-WHITTAR INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000407131	42.442136	-83.034196
PYC DAVIS GRAPHICS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009596703	42.44229	-83.00498
BILLMAY PROPERTIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003560780	42.44234	-83.00499
PARCELLS MIDDLE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007596173	42.44255	-82.90702
DETROIT PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003648740	42.44278	-82.95958
UPS WOODBRIDGE CENTER DET	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003678707	42.443028	-83.005014
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573534	42.44313	-82.97239
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653127	42.44331	-82.90712
NORTOWN COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003598508	42.44336	-83.02455
MASONIC TEMPLE ASSOCIATION OF GROSSE POINTE WOODS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016739341	42.44345	-82.90594
HARPER WOODS HIGH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003656696	42.44352	-82.93174
B AND E MARATHON	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573936	42.44355	-82.94615
ARCTIC MAINTENANCE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003558980	42.44379	-83.00504
COUNTY OF WAYNE PUBLIC SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003631259	42.44386	-83.00504
EXXONMOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636398	42.44387	-82.90674
15000 ASSOCIATES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604582	42.44414	-82.97171
W INDUSTRIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597322	42.44416	-83.00506
DAIMLERCHRYSLER CORP. MOUND RD. ENGINE PLANT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000407097	42.44444	-83.04382
ST RAYMOND CATHOLIC CHURCH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015915223	42.44479	-82.99034
FIFE PEARCE ELECTRIC COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043310592	42.44517	-83.03441
MOTECH AUTO BODY REPAIR SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003718530	42.44518	-83.0051
WCI CONTRACTORS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015814671	42.44522	-83.02066
YRCW DBA HOLLAND DE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121025	42.44522	-83.02066
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573927	42.44538	-82.91692
GEE GEE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587020	42.44545	-82.97084
LUTHERN SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003671526	42.44555	-82.94466
US TRANSLOADING SERVICES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979269	42.4456	-83.03936
COOPER HEAT TREATING LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000407122	42.445833	-83.035
CUETER BROTHERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003668512	42.44584	-82.90659
TRIX ELEM SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021730046	42.44586	-82.98398
INLAND TOOL AND MFG	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003661822	42.44627	-83.00503
SPEEDWAY SUPERAMERICA LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646127	42.44634	-82.91652
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020887450	42.44699	-83.04392
MARS CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024556158	42.447	-83.08468
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007576015	42.44703	-83.08373
APEX DRUG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054842186	42.44706	-83.08144
KFC NATIONAL MANAGEMENT CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015896182	42.44713	-83.07612
BODY SHOP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003629949	42.44714	-83.03448
NAVARRE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448509	42.44721	-83.06942
MICHIGAN MOTOR EXCHANGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008451932	42.44722	-83.06831
CITY OF DETROIT FIRE DEPARTME	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015899205	42.44723	-83.06666
JAG IV LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607035	42.44724	-83.00517
SAVE-A-LOT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070541253	42.44731	-83.08396
WALGREEN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377139	42.44734	-83.08268
CITY OF DETROIT FIRE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015793989	42.44735	-83.04755
MI DEPT/MILITARY & VETERANS AFFAIRS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042280652	42.44736	-83.06039
GALAXY LAUNDRY & DRY CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007585540	42.447367	-83.08049
NU METRIC BODY WORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008456795	42.44739	-83.07884
MCGREGOR SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021872874	42.447412	-82.953596
AUTO RECONDITIONING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008452735	42.44745	-83.07515
O & A PETRO MART	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038872967	42.44747	-83.04424
REGAL STAMPING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006516797	42.4475	-83.00518
DETROIT FIRE DEPARTMENT - INCIDENT #22762	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044814485	42.4475	-83.00518
THE OIL DISPATCH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007580037	42.44752	-83.06844
AA BRAKE & LUBE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007585345	42.44758	-83.05146
8 MILE AND BLOOM CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008438743	42.44762	-83.04992
HOME DEPOT USA INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015873955	42.44774	-82.943
INDIAN VILLAGE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003618559	42.44775	-82.90576
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064668523	42.44777	-83.05607
HENLEY BLUEWATER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007580518	42.44783	-83.05369
ACCURATE MOLD & PLASTICS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007583551	42.44783	-83.04241
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016740847	42.447867	-83.051934
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007588235	42.44791	-83.05012
CHRYSLER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037401200	42.44794	-83.03616
A AND S INDUSTRIAL COATING CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007582507	42.44797	-83.0478
HERNANDEZ/SPISZ ENTERPRISES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015900783	42.44797	-83.00519
INTERNATIONAL TRANSMISSION COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008442881	42.448106	-83.04287
MR CS CAR WASH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043183391	42.4482	-82.9157
K AND B CAR WASH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008439127	42.44822	-83.0228
STOP & LOOK AUTO SALES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015898563	42.44824	-83.0217
DETROIT EDISON NORTHEAST STATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020576795	42.44824	-83.03729
BELAIR THEATRE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007598787	42.448265	-83.020889
AIR ENGINEERING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015828791	42.44828	-83.03301
REMAN CLUTCH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008445664	42.44829	-83.0326
BUILDERS SQUARE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008449321	42.44833	-83.01868
TARGET CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008440302	42.448355	-83.017902
WOOD MOTORS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006514478	42.448425	-82.968881
LEONARDO SOUTH LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110032636869	42.44844	-83.02554
DETROIT WATER AND SEWERAGE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070540609	42.448484	-83.013037
ADVANCE AUTO PARTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024254876	42.448487	-83.02381
COLISEUM ADULT ENTERTAINMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044818757	42.44858	-83.0099
PG1 LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044930037	42.44862	-83.00905
US EQUIPMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003690435	42.44865	-83.0052
EME ENTERPRISES CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037408105	42.44871	-82.9054
SLC ACQUISITION LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039577650	42.44872	-83.01534
CARBOLOY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110018942778	42.44876	-83.01379
FEDERAL INDUSTRIAL SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031390395	42.44881	-83.01194
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064667659	42.44884	-83.02484
3M CO - DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000593055	42.4489	-83.00238
WARREN CUSTOM PLATING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444200	42.44895	-83.00857
SABISTON BUILDERS SUPPLY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007595281	42.44903	-83.00697
LOWE'S HOME CENTERS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024254509	42.44903	-82.93049
CITY OF GROSSE POINTE WOODS DEPT OF PUBLIC WORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007582446	42.44912	-82.8918
GROSSE POINTE LAUNDRY & DRY CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015843989	42.44913	-82.90525
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007575980	42.449186	-83.002034
MORAN FOODS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064380343	42.449221	-83.000871
KROGERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003592746	42.449363	-82.915214
BEAUTY GUARD AUTO CTRS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008447957	42.44941	-82.98035
R & K INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007587478	42.449434	-82.979324

Site Name	Type	ID	Latitude	Longitude
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045977671	42.449444	-82.968207
JLQ AUTOMOTIVE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007574669	42.44947	-82.97861
MARIAH INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007586889	42.449473	-82.990477
ACE FINISHING INCORPORATED	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002305470	42.44948	-82.9901
MARASCO'S PAINTING COMPANY / M & M COATI	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007275475	42.4495	-82.9986
GCH TOOL GROUP INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110062928596	42.4495	-82.98927
GRINDERS CLEARING HOUSE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008449090	42.449507	-82.988899
WARREN ENGINE EXCHANGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584060	42.44956	-82.98639
REPO DEPO EAST	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008447056	42.44957	-82.97475
AL LONG FORD INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008445389	42.449623	-82.984082
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664251	42.449659	-82.982844
ECOLAB INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887067	42.44978	-82.90502
TARGET STORE T0776	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003558695	42.44988	-82.93403
SEARS ROEBUCK CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020487052	42.44988	-82.93403
MACY'S EASTLAND (MI)	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037410637	42.44988	-82.93403
LENS CRAFTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037411440	42.44988	-82.93403
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067417833	42.44988	-82.93403
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064667187	42.44993	-82.934232
PEP BOYS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007591481	42.44995	-82.96292
DRUMMY OLDSMOBILE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444781	42.45004	-82.96993
RICHARDS COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448313	42.45005	-82.95675
ALL AROUND MOBIL WASHING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037409202	42.45016	-83.0186
TOTAL PETROLEUM (NORTH AMERICA) LTD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584649	42.45023	-82.94039
MR ALANS MENS BOOTERY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016721733	42.45044	-82.93494
D AND S COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003594753	42.4505	-83.02519
D AND H FRAME	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009598257	42.4505	-83.02519
STREETS AUTO BODY REPAIR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003614054	42.45051	-82.98572
WALGREEN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377745	42.45055	-82.94005
WASHINGTON MUTUAL BANK FA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007578601	42.45061	-82.93672
FCA US LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575809	42.450742	-83.034595
PRODUCTION TOOL SUPPLY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015806056	42.450886	-83.017779
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020897966	42.45089	-82.96731
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636593	42.451	-82.91448
ASCENSION PARISH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037414278	42.451006	-83.021961
K AND L AUTO GLASS AND COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003628236	42.45128	-82.98574
WALGREEN CO.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056319675	42.45156	-82.91423
ARES MANUFACTURING CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003580759	42.45166	-83.00534
GREAT LAKES OIL RECOVERY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110014351511	42.45166	-83.00534
DOLLAR EXPRESS STORES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664956	42.45181	-82.96626
PLYMOUTH TUBE CO AMERICAN TUBING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604038	42.45193	-83.00047
KELLYS COMPETITION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003625701	42.452057	-82.985768
PRECISION TUNE AUTO CARE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003659728	42.45248	-82.96581
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887101	42.4526	-82.91377
DOCTOR JOSEPH & SCHWARTZ	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412535	42.45263	-82.91375
KELLY FAMILY PRACTICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043413302	42.45265	-82.93882
QUANTUM LIFT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037404975	42.45271	-83.01794
MILBRAND ROOFING CO LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003584924	42.45274	-82.98579
DIH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003595770	42.45274	-83.01117
TEMARON CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015834533	42.45291	-82.99975
INTEGRATED INTERIORS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009394208	42.45295	-83.00537
CATHOLIC CHURCH NORTH AMERICA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015843266	42.45322	-82.90363
GRAPHIC ASSOCIATES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006411882	42.45343	-83.00539
PLATING TECHNOLOGIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044930019	42.45343	-83.01119
AMERICAN FELT & FILTER CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003608668	42.45345	-83.00539
MOTOR CITY REMAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015821770	42.4536	-82.96551
B&L PLATING, INC.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001679425	42.45371	-83
OVERMAN RESIDENCE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009292880	42.45387	-82.88513
DCT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003671232	42.45389	-83.01121
RELIANT INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031393187	42.454028	-82.998914
ENTHONE OMI INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000405320	42.45406	-83.0054
CALGON CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009595759	42.45406	-83.0054
EMERALD BUSINESS PARK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979250	42.4541	-83.0054
HEALTH ONE MEDICAL CENTER EASTPOINTE PLLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020485731	42.45416	-82.93739
INTERNATIONAL TRANSMISSION COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017223654	42.454431	-82.936169
R & R MFG	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016736772	42.45451	-83.01123
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574711	42.45472	-83.02612
CCT DE'COUPER INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003718291	42.45499	-83.00542
SCIWAY PAINTING LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042280279	42.45499	-83.01124
QUALITY SPINDLE SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015893988	42.45503	-83.01125
WORKBLADES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110040521414	42.45506	-82.99814
EQUIPMENT MFG INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001840688	42.45519	-83.00542
SAS GLOBAL FKA SURE ALLOY STEEL CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039560748	42.45528	-83.01125
TECHNICAL SERVICE PROFESSIONALS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633499	42.45534	-83.00542
FCA US LLC WARREN TRUCK ASSEMBLY PLANT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000405393	42.45544	-83.040949
FLEETWOOD COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003628094	42.4556	-82.91242
HOOVER STEEL TREATING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000405302	42.455736	-83.005432
RJR AUTOMOTIVE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055930177	42.45591	-82.90243
GARY BILL MD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412205	42.45601	-82.93565
MACHINING ENTERPRISES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003629896	42.456085	-83.010779
RESPONSE FORKLIFT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110032670483	42.45619	-82.99731
CN CARGOFLO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000568779	42.45624	-83.00197
NEXEO SOLUTIONS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003683755	42.45624	-83.001954
DY CHEM PROD CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003661083	42.45637	-83.00544
LINDE GASES OF THE GREAT LAKES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579841	42.45666	-82.99695
NORTHERN TRANSPORT CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009599470	42.45666	-82.99695
MICHIGAN FIRST CREDIT UNION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046530410	42.45685	-82.96293
CLARK OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003686191	42.45691	-82.98594
CROSS CO THE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003718656	42.456954	-82.993227
CITY OF WARREN - TAX INCREMENT FINANCE AUTHORITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044817062	42.45707	-83.02641
KELLY DRY CLEANING LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003618997	42.45719	-82.93454
INDUSTRIAL FOAMCRAFT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003596662	42.45727	-83.00547
MOBIL CONCEPTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042281358	42.4573	-82.98595
FLORKEY'S CONVEYOR SERVICE COMPANY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001441388	42.45743	-82.99324
EASTLAND CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003590276	42.4576	-82.91152
J & P ELECTRICAL COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110069391875	42.45763	-82.99325
HISTOLOGY ASSOCIATES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636085	42.45773	-82.90162
CITY OF WARREN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110032636244	42.45781	-83.02644
GENESIS AUTO SALES INC DBA GENESIS CHEVROLET	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070540627	42.45789	-82.96269
GLE SCRAP METAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110040418900	42.457966	-83.034847
VAN DYKE SCHOOLS ADMIN BLDG	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003568354	42.45808	-83.02095
BEST BLOCK CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021010840	42.45814	-82.99586
MEROLLIS CHEVROLET SALES & SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003698455	42.45828	-82.962423
CLARK GRAPHICS SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003716364	42.45829	-82.99328
PAINTERS SUPPLY AND EQUIPMENT CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038870889	42.45841	-83.02647
ALLIED PROD CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003599375	42.45846	-83.00551
GROSSEL TOOL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581302	42.45855	-82.99328
AJAX METAL PROCESSING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000405311	42.45856	-83.00552
MEROLLIS CHEVROLET SALES & SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003595100	42.45864	-82.96174

Site Name	Type	ID	Latitude	Longitude
GLE SCRAP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039564085	42.45865	-83.03487
ROYAL CENTERLESS GRINDING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055447360	42.45865	-82.99329
WOLVERINE DIE CAST CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001843541	42.45868	-83.00221
RUSS SIMPSON CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015795139	42.45887	-82.986
R AND D AUTO SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003673310	42.45907	-82.90102
SOUTH LAKE SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066968525	42.45907	-82.91953
SMS TECHNICAL SERVICES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003623990	42.4591	-83.00222
PERRY DRUG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054838921	42.45923	-82.88251
COLLISION CRAFTSMEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003608542	42.45956	-82.98603
KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037409701	42.45958	-82.88393
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045978536	42.45971	-82.90073
J & P ELECTRICAL COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110069392222	42.45974	-82.99333
CARING FOR YOU ENTERPRISES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003565758	42.45975	-82.98349
CONRAIL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022477274	42.45977	-83.03492
ACUMENT GLOBAL TECHNOLOGIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042286022	42.4598	-83.00772
OPEX COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003629574	42.45992	-82.98604
IRENE WOLF	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015833838	42.46013	-83.00557
GREAT LAKES FREIGHTLINER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003592014	42.46014	-82.99438
MICHIGAN IRON & STEEL SUPPLY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037407516	42.46021	-83.00557
PREMIER FINISHES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003652878	42.46058	-82.99405
RSG INDUSTRIAL REPAIR DBA CARTS-N-MORE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003647643	42.460812	-83.034958
PERFORMANCE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003661519	42.46114	-82.98607
INVECAST CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001846192	42.4613	-83.03343
WOOSTER INDUSTRIAL SERVICE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575667	42.4613	-82.87648
C & R MAINTENANCE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022919314	42.46136	-82.99346
BAR PROCESSING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579093	42.46143	-82.99341
AMERICAN METAL PROCESSING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042286184	42.46144	-83.00192
INDUCTION ENGINEERING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003605992	42.46177	-83.03499
KING CLEANERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003590613	42.4618	-83.02663
CLARK OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003657258	42.46202	-82.90954
ALL COTE COATING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002375233	42.46208	-83.03501
EAST DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006412140	42.4625	-82.96263
FOUR SEASONS FORMAL WEAR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003611976	42.46267	-83.00319
WALGREEN CO.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377656	42.46267	-83.02665
EVERFRESH JUICE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008446896	42.46278	-83.0362
VAN DYKE PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003682300	42.46284	-83.02117
US POSTAL SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037397821	42.46285	-82.95895
CITY OF WARREN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015885942	42.4629	-83.03292
POTJES CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587510	42.46291	-82.92914
PENINSULAR CHEMICAL PDTS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007598251	42.46292	-83.03247
J LEONARD LTD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003577111	42.46304	-82.91257
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664527	42.46309	-83.02766
HOOVER 9 SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573892	42.46316	-83.00565
LAMB JOSEPH F CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008449447	42.46317	-83.02402
CITY OF WARREN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015885979	42.46325	-83.02135
VAN DYKE COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042280359	42.46337	-83.01607
CUTMORE TOOL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443746	42.46339	-83.01487
DONNELLY AUTOMOTIVE CORE RECYCLING LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039577632	42.46339	-83.01533
SCHOENHERR IRON WORKS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015913396	42.46344	-83.01136
NORTON CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448466	42.46345	-83.01087
VAN DYKE PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584042	42.463453	-83.009849
YALDOO AUTO BODY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066970291	42.46347	-83.00633
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584694	42.46348	-83.00505
COLTEC INDUSTRIES INC HOLLEY AUTOMOTIVE DIV	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007275732	42.46352	-83.00323
AMERICAN METAL PROCESSING CO.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444004	42.46356	-83.00204
WOCO-MAXTECH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020482663	42.46361	-83.03515
MIDWEST PAPER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121199	42.46362	-82.99958
BUNDY CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002472422	42.46366	-82.99838
INALFA ROOF SYSTEMS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443504	42.46369	-82.99725
UNIVERSAL AM-CAN LTD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008447225	42.46374	-82.99517
WEYERHAEUSER CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008447136	42.46375	-82.99404
NORBROOK PLATING, INC.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110010727231	42.463776	-83.009942
CITY OF WARREN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015885997	42.46379	-82.98935
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045978830	42.46387	-82.98499
M & W MANUFACTURING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443871	42.46388	-82.98446
COLLEX COLLISION EXPERTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042280064	42.4639	-82.98381
GAGLIANOS AUTO CRAFT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448545	42.46391	-82.98329
BUILDING DECOMMISSION SERVICES LLC DBA BDS ENVIRONMENTAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070516246	42.46393	-82.98268
CONSUMERS ENERGY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022478503	42.46395	-83.02405
PNEUMATIC FEED SVC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448091	42.46406	-82.97789
PATRIOT AUTO SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070206604	42.46408	-82.97738
MAJOR MACHINE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443675	42.4641	-82.9768
IPS RETAIL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003571028	42.46415	-83.02671
MILJOCO CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443602	42.46417	-82.9755
PETCO STORE #834	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056320832	42.464233	-82.958493
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066971968	42.464238	-82.986177
7-ELEVEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042280135	42.4643	-82.98618
EAST SIDE CONCRETE WARREN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110060259410	42.4643	-82.99127
PERRY DURG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054841604	42.46431	-82.958
I AND G TOOL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008438538	42.46434	-82.97279
EASTPOINTE AUTO CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008456955	42.46463	-82.95548
FERGAN'S AUTO PARTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015837950	42.46463	-82.95546
GROSSE TOOL AND MACHINE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003643549	42.46465	-82.991
EASTPOINTE HOUSING COMMISSION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024254135	42.46465	-82.96033
CLASSIC COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448732	42.46471	-82.96747
URBAN ASYLUM INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046259124	42.46472	-82.99095
FIRST OF AMERICA BANK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015926211	42.46474	-82.95181
KMART OPERATIONS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042283711	42.46475	-82.90835
CHAMPS AUTO SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044930108	42.46475	-82.90835
SUPREME PLATING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015804735	42.46476	-83.03528
MICHIELUTTI BROTHERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024546525	42.46476	-82.96603
JOHN AND HOLGER SVC CTR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007583613	42.46477	-82.95056
EASTSIDE COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008452931	42.4648	-82.94903
DAVIS COLLISION SERVICE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003620270	42.46482	-82.9862
IMPRESSIVE AUTO SERVICES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444503	42.46482	-82.94798
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006411098	42.46487	-82.95808
STABLEY PAINTING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056319470	42.46492	-82.94492
ALLSTATE LIFT TRUCK REPAIR INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022479566	42.46493	-82.99716
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008441971	42.46494	-82.94407
AUTO AID AND TEK COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448858	42.46498	-82.94296
AUTOWAY COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110059668113	42.46498	-82.94296
GEORGES AUTO RECONDITIONING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448180	42.46499	-82.94271
GUNN ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024441406	42.46499	-82.94268
TUBE CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015886479	42.465	-82.98621
JIFFY LUBE INTERNATIONAL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046529459	42.46502	-82.92688
GEORGES AUTO RECONDITIONING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121255	42.46503	-82.94128
AMAL GAS & OIL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007585746	42.4651	-82.93889
A W CUSTOM CHROME INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007371806	42.46512	-82.93822

Site Name	Type	ID	Latitude	Longitude
HENLEY BLUEWATER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044975569	42.46516	-82.93701
GROESBECK LUMBER AND SUPPLY COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066968115	42.46518	-82.99061
MAYNARD MANUFACTURING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003651218	42.46523	-82.94972
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064668435	42.465236	-82.934867
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045978698	42.46527	-82.93362
PPI AEROSPACE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002356833	42.46528	-82.99717
DETROIT EURO CYCLES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022471500	42.46533	-82.93149
MORTELL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002117218	42.46534	-83.03535
CHAPATON RETENTION TREATMENT BASIN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039714994	42.46544	-82.88522
MICHIGAN FIBERGLASS SALES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444790	42.46545	-82.92771
WOODWARD DETROIT CVS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110063079092	42.46546	-82.92744
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008441356	42.46551	-82.92603
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007574400	42.46562	-82.92197
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008455581	42.46567	-82.92009
AMERICAN CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003699506	42.4657	-82.89645
ZIEBART INTERNATIONAL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044819300	42.46571	-82.91911
CASCOAT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006513647	42.46574	-82.99601
MAACO AUTO PAINTING & BODYWORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448616	42.46575	-82.91792
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003655429	42.46576	-82.90791
GENESIS AUTO SALES INC.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007596119	42.46579	-82.91695
HENKEL CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000405366	42.46582	-83.03541
FEDEX FREIGHT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070680756	42.46582	-83.03541
SMW AUTOMOTIVE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046396066	42.465883	-82.996012
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653136	42.46589	-82.88591
SHORES DIAGNOSTIC CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043419501	42.46592	-82.91331
POINT FAMILY PHYSICIANS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043421525	42.46592	-82.91331
ROY OBRIEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038868810	42.46596	-82.91251
DEWITT TOOL & MFG	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015807019	42.46598	-82.9121
YATES INDUSTRIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008446921	42.466	-82.91157
SHORES AUTO BODY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008445682	42.46606	-82.91026
MDM ENTERPRISE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024552134	42.4661	-82.90931
T & M HOME IMPROVEMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015842846	42.46612	-82.90862
BORDER CITY TOOL AND MFG	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633122	42.46618	-82.99602
ADVANCE AUTO PARTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038869748	42.46619	-82.95721
AMERICAN MODEL AND PATTERN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003672339	42.466304	-82.918946
ST CLAIR SHORES SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070206574	42.46635	-82.9018
ENGINEERING LABS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015904510	42.466368	-82.918856
AAA LIFT TRUCK SERVICES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037403146	42.4664	-82.91587
ROY OBRIEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038864315	42.46643	-82.8996
9 MILE HARPER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039576651	42.46657	-82.90755
KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037416267	42.46658	-82.89541
BCP LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021011297	42.46663	-82.89427
MNP CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055526550	42.46665	-82.91588
DETROIT SPECTRUM PAINTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044977549	42.46668	-83.00583
WEBER ELECTRIC MFG CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003596528	42.466688	-82.918411
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887405	42.46672	-82.892
GRINNELL SCREW PRD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001298694	42.466762	-82.91833
SAINT BASIL THE GREAT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042405297	42.46681	-82.93429
ARROW TOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003669361	42.46703	-83.01007
WACHTEL TOOL AND BROACH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054838324	42.46703	-82.99725
HERCULES WELDING PROD CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003647778	42.46706	-83.00818
AMERICAN GRAPHICS PRINTING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003668521	42.46708	-83.00692
EMS CLASSIC CAR CARE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067205358	42.46708	-83.00714
PERMA TEX RESURFACING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003705704	42.4671	-82.95661
UNITED LIGHTNING STANDARDS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003647420	42.4672	-82.9891
FINAL FINISH RESTORATION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003712475	42.46721	-82.91578
TRI COUNTY INTERNATIONAL TRUCK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003627335	42.46729	-82.98904
IDEALEASE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022480206	42.46729	-82.98904
E W ENSROTH COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016725640	42.46741	-83.00587
SUBURBAN ENGINE EXCHANGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636263	42.46744	-82.98631
PRODUCTION PLATING FIRE SITE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000404544	42.46751	-82.9559
WACHTEL TOOL AND BROACH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003585932	42.46752	-82.99727
ROY OBRIEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003624579	42.467603	-82.897175
GREAT LAKES POWER PRODUCTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110014456436	42.46763	-82.91561
FORMSPRAY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003605340	42.46774	-83.00588
COLUMBIA DET LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070559339	42.46787	-82.90699
VAN WORMER IND INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003666346	42.467871	-82.917757
GENESIS AUTO SALES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064164988	42.467871	-82.917757
PPI AEROSPACE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110041041315	42.46814	-82.98841
FUTURE FENCE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003712563	42.468211	-82.992569
K & K STAMPING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016727363	42.468222	-82.917602
M R D AEROSPACE LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044817507	42.46823	-82.98634
ACE FINISHING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003582436	42.46824	-82.99729
DEES OIL CHANGE LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574276	42.46828	-82.95582
USCG SECTOR DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064662636	42.46836	-82.88731
MI DEPT/DEQ RRD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070206548	42.46836	-82.88731
THE CROSS COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003580526	42.46838	-83.00591
WEAR EVER SURFACE TREATING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003565678	42.46839	-82.98509
GENTZ IND	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002117192	42.46844	-82.98635
A AND S INDUSTRIAL COATING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003697795	42.46861	-82.9973
MARS MACHINE REPAIR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003693520	42.468634	-82.986358
H & P TECHNOLOGIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003671036	42.4687	-82.99731
JEFFERSON PLAZA LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045415500	42.46871	-82.88751
H AND H COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003610502	42.46875	-83.02689
BTI MICHIGAN ST CLAIR SHORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003663740	42.468874	-82.915827
WELDEX INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015911833	42.46911	-83.00594
RICO'S AUTO SPECIALTY SHOP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031373029	42.46925	-82.90663
EMERALD CITY HARBOR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003585362	42.46934	-82.88785
BUILDING DECOMMISSION SERVICES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038869926	42.46934	-82.99734
VARGO CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003665739	42.469364	-82.955124
US DEPT/HOMELAND SECURITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042156699	42.469426	-82.887889
BUILDING DECOMMISSION SERVICES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003582971	42.46945	-82.99614
WARREN ENGINE EXCHANGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003565231	42.46947	-82.98513
STEEL PROCESSING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110040496950	42.4695	-82.9874
YATES INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003640515	42.46973	-82.91533
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575159	42.46988	-82.90612
RUSSELL A SASSACK DDS PC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015872304	42.4699	-83.02694
BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664901	42.46999	-82.90677
IROQUOIS INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009394663	42.47005	-82.9925
COMCAST OF MICHIGAN/MISSISSIPPI/TENNESSEE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039571843	42.47019	-82.91321
EAST DETROIT SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064156924	42.47019	-82.96458
ALL SEASONS PAINTING CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003678609	42.47022	-82.90442
GOLDEN CHOPSTICKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044812192	42.4705	-82.88834
EAST LIND HEAT TREAT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003609989	42.47063	-83.00933
TRAC - TECH INC.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003609621	42.470637	-83.008906
GIDDINGS AND LEWIS DRILL UNIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003563625	42.47064	-83.00873
CERATIZIT USA, INC.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579119	42.47066	-83.00791
WELDALOY PRODUCTS COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581605	42.47069	-83.0069

Site Name	Type	ID	Latitude	Longitude
CADILLAC PLATING CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000405268	42.47076	-82.98647
CITY OF SAINT CLAIR SHORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003669806	42.470909	-82.916176
WENTWORTH ACQUISITION LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015844899	42.47092	-82.99797
ATREX INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020899250	42.470926	-83.005993
GROSEBECK MINI MART INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003654377	42.47093	-82.98634
WILKIE LAWN SERVICE DIV	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646895	42.470936	-82.997188
INTERNATIONAL TRANSMISSION COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016719318	42.47094	-82.99695
CMX CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003602218	42.47099	-82.99483
VERTICAL TECHNOLOGIES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003582481	42.47102	-82.9936
LOC INDUSTRIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110069286917	42.47104	-82.99261
ANCHOR TOOL AND DIE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003582445	42.47105	-82.9916
PIONEER METAL FINISHING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009395779	42.471064	-82.989852
DISTRIBUTOR SERVICE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067044031	42.47107	-82.98919
LC YOUNG PAINTING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003578067	42.47108	-83.00291
LITTLE MACK MEDICAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024554622	42.47108	-82.9068
MITSUBISHI CHEMICAL PERFORMANCE POLYMERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003594673	42.47112	-83.006
TEXTURE RITE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003713526	42.47114	-82.90557
CHEMTECH HOLDINGS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009395617	42.47138	-82.98033
JEFFERSON BEACH PROPERTIES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003584942	42.471437	-82.888706
DETROIT SPECTRUM PAINTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003672641	42.471445	-83.006
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979571	42.471654	-82.905335
PARKER HANNIFIN RTRY ACTIVATORS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003611084	42.47177	-82.90682
TWEDDLE LITHOGRAPH CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001441226	42.47181	-82.90527
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006410712	42.47185	-82.9535
WINE DOCK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003629761	42.47189	-82.88884
CREATIVE ELECTRO PLATING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003593166	42.4719	-82.98649
DURAMIC SEGMENTS & ABRASIVE, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001845255	42.47207	-83.00293
PERFECT INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003563974	42.47213	-83.00601
CHARTER ONE BANK FSB NKA CHARTER ONE BANK N A	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016719489	42.47222	-82.95123
THE MEADE GROUP INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015840571	42.47234	-82.94321
PREMIER FAMILY PHYSICIANS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043413286	42.47238	-82.90684
COLONIAL DODGE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015801097	42.47239	-82.95269
MECHANIC MIKES AUTO REPAIR INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020476787	42.47255	-82.98512
UNICOTE CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001840704	42.4727	-83.00294
COLONY MARINE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022480135	42.472737	-82.889014
SCI	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003690391	42.47274	-83.00294
U HAUL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003680874	42.47288	-82.90687
MEYERS AUTOMOTIVE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003686342	42.47295	-82.98482
ST CLAIR SHORES ICE ARENA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015796245	42.47308	-82.91421
KENCOAT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037414232	42.47316	-83.00295
TAYLOR ROOFING AND MAINTENANCE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003679626	42.47317	-82.90952
BUTCHER BOY MEATS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003684610	42.47318	-82.90889
MICHIGAN MARINE GEAR INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043548578	42.47318	-82.90853
HYDRAULIC ACCESSORIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003581400	42.47321	-83.00602
DRYCLEAN DEPOT LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110023049182	42.4734	-83.02707
BELLE TIRE DISTRIBUTORS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024255143	42.47359	-83.00603
IROQUOIS ASSEMBLY SYSTEMS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039578640	42.47381	-83.006033
CASCOAT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003591239	42.47388	-83.00603
AS-TECH INDS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003716612	42.474	-83.00249
MODERN BROACHING SVC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042282641	42.47417	-83.00237
PACKAGING SPECIALTIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031366616	42.4742	-83.01025
ALMO MANIFOLD AND TOOL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003693913	42.47425	-83.00801
MARILYN J. FREDERICK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070432824	42.47426	-83.00764
COMPANY PRODUCTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045546129	42.47448	-83.004141
MILLER MARINA 1380	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003664918	42.47463	-82.889271
KING MARINE EAST	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003674328	42.47463	-82.889271
A B C HONING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003689321	42.47468	-83.00222
HENRY FORD HEALTH SYSTEM DBA HENRY FORD HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055448537	42.47472	-82.88928
NORTH AMERICAN GRAPHICS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044810434	42.47479	-83.00222
SERVICE KING PAINT & BODY, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003620190	42.47483	-82.95153
US DEPT/HOMELAND SECURITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003572651	42.474848	-82.88928
SUR FLO PLASTICS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001300066	42.47494	-82.98334
ELITE STAINLESS STEEL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037406928	42.47495	-82.98334
KOONTZ WAGNER ELECTRIC CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003587084	42.474954	-83.002228
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020895959	42.47521	-82.95085
NORBERT INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003687467	42.47525	-83.00224
GRATIOT ENGINE EXCHANGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006412159	42.47532	-82.95121
JERRY LYNCH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003561057	42.47584	-82.95088
PEP BOYS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009393888	42.47599	-82.95034
VITULLO & ASSOCIATES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038866439	42.47607	-82.98665
GLO TONE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003642121	42.47613	-83.02716
FUTURAMIC TOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037398811	42.476137	-83.002268
FUTURAMIC TOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056319648	42.476519	-83.002281
AMERICAN CUSTOM ENCLOSURES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009596543	42.47681	-82.98668
GRATIOT BAY WASH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017876039	42.47689	-82.94975
WEST MARINE PRODUCTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042419521	42.47705	-82.88927
BAVARIAN MOTOR VILLAGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003673034	42.47708	-82.95006
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003658970	42.47709	-83.0272
MICHIGAN DRUM RENOVATING CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001847271	42.47723	-82.98669
AMERCO REAL ESTATE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024254439	42.47733	-82.98156
ATSALIS BROTHERS PAINTING COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045546263	42.47735	-82.98155
THE SHERWIN WILLIAMS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015826463	42.477491	-83.026536
PERFECTION COATINGS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443942	42.47755	-83.02205
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664812	42.4776	-83.019341
SERVICE KING PAINT & BODY, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008450657	42.47765	-83.01753
J & J DRY CLEAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044811184	42.47765	-82.94924
HENRYS CLEANERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037412109	42.477699	-82.902712
A-1 BUSINESS PRODUCTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008454001	42.47776	-83.01293
RALPH CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007597582	42.47777	-83.0125
HI-TECH COATINGS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110040998383	42.47778	-82.98842
WALGREEN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377406	42.47779	-82.98672
LAKEVIEW PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015901443	42.47787	-82.90955
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007575793	42.4779	-83.00648
FRESCURAS SVC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584792	42.47792	-83.00551
C F E RACING PRODUCTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003564802	42.47799	-82.94802
DETROIT EDISON CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008442890	42.478071	-82.997773
DTE GAS COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007591800	42.47813	-82.99512
DISTEL TOOL & MACHINE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037400014	42.47814	-82.99418
CHAS F IRISH CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003590604	42.47815	-82.98095
CAM 2 TUNE UP CTR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574105	42.47825	-83.00613
BI-COUNTY COMMUNITY HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008447127	42.47827	-82.98738
ALOU ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008440936	42.47828	-82.98708
WIDGER GROUP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443915	42.47841	-82.98478
IMMANUEL PROCLEAN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042285924	42.47842	-82.94874
EFTEC NA LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000405286	42.47845	-82.98428
AUTOMOTIVES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008455956	42.478633	-82.981593
MARVAL VENTURES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003629798	42.47866	-82.98124
PRECISION TUNE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003677227	42.47868	-82.98674

Site Name	Type	ID	Latitude	Longitude
ADVANCE AUTO SERVICE CENTER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024552642	42.4787	-83.00615
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001846094	42.478736	-82.948402
GENTZ AEROSPACE PRODUCTIONS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015912253	42.478766	-82.979615
CAROLINA TWIST DRILLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008453306	42.478769	-82.979584
LINCOLN GAGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444219	42.478771	-82.979552
A AND P TOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008439047	42.47881	-82.97905
L & M MACHINING & MFG INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031360514	42.47883	-82.97865
AMERICAN BLOWER SUPPLY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043310725	42.47888	-82.97797
ZAPIT EXPRESS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015807484	42.47891	-82.97752
7-ELEVEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042286362	42.47905	-82.9803
SEIBERT G L CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444371	42.47909	-82.9746
EASTPOINTE FAMILY PHYSICIANS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015807073	42.47911	-82.92723
SILVER RECOVERY SPECIALISTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003618675	42.47921	-82.92058
ST JOHN FAMILY MEDICINE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044976023	42.47928	-82.90712
MASCO INDUSTRIES INC KEO CUTTERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597153	42.47935	-82.9759
NORTH SHORE VALET	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604163	42.47945	-82.88926
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045977412	42.47952	-82.92725
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007575668	42.479557	-82.966402
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007574419	42.47956	-82.965344
JOES EQUIPMENT & REPAIR INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015825963	42.47957	-82.961472
GERRYS EAST DETROIT COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008446761	42.479581	-82.960155
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064667864	42.479612	-82.956915
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979401	42.47962	-82.95652
STAN YEES COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008452254	42.479678	-82.950553
SLIMS ALIGNMENT SERVICE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444807	42.47972	-82.94716
COMBINE TOOL AND DIE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443577	42.479783	-82.944258
L & M MACHINING & MFG INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008443657	42.47979	-82.94418
COONEY INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008444362	42.479797	-82.943713
FIBER RESIN CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633961	42.479892	-82.984332
CGS AUTO AND TRUCK REPAIR INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007579888	42.47991	-82.93915
STATE FARM INSURANCE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007581795	42.47998	-82.93635
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008451237	42.480022	-82.934888
BECKER MANUFACTURING ROSEVILLE DIV.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007274895	42.48004	-82.93451
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015884177	42.480042	-82.889301
BOND CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003622018	42.480065	-82.907159
MICHIGAN CANCER SPECIALISTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110040444187	42.48009	-82.93294
CENTER FOR WELLNESS & FAMILY MEDICINE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043311341	42.48009	-82.93274
ANTONACOPOULOS INTERNAL MEDICINE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412269	42.48009	-82.93276
EASTLAKE PEDIATRICS PC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066971281	42.48012	-82.93181
BELLE TIRE DISTRIBUTORS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042283007	42.48015	-82.90165
WALGREEN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377228	42.48017	-82.907163
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008441374	42.480273	-82.926822
EXXONMOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007576774	42.48028	-82.92639
URBAN GRAFTON	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015877381	42.48037	-82.88576
KEE SERVICES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597162	42.48042	-82.97595
JACK C HERMES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008457213	42.48045	-82.91891
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007576006	42.48047	-82.91739
MEIJER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070225042	42.480478	-82.986764
HARPER FAMILY PRACTICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412973	42.4805	-82.91576
SHELL OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007580162	42.480622	-82.907891
SURE COAT INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009396144	42.48069	-82.97596
SPARKLE CLEANERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003603422	42.48077	-82.94763
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003664829	42.48078	-82.90138
RITE AID OF MICHIGAN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054841695	42.48086	-82.90135
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007577657	42.48117	-82.90719
MB AEROSPACE WARREN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003700139	42.48118	-82.97598
VIRGINIA MEADE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015804441	42.48133	-82.93069
GREAT LAKES PHYSIATRISTS PC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064667766	42.48195	-82.90721
HOUSTON INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003617532	42.48198	-82.93778
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058888011	42.482117	-82.927295
PETES COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003651548	42.48214	-82.94674
RESKA SPLINE PRODUCTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003613340	42.482306	-82.976028
IRO TEK INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017618292	42.4825	-82.97773
BILLS TRANSMISSIONS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003577834	42.48276	-82.94633
WM BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887833	42.48296	-82.90724
GOLLING ROSEVILLE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003674916	42.482961	-82.945748
BELLE TIRE DISTRIBUTORS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042283846	42.48303	-82.94571
COTTAGE ROSE VILLA NURSING CTR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003625578	42.48305	-82.92734
IROQUOIS INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003643200	42.48321	-82.9772
PREFERRED FILTER RECYCLING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003692246	42.48343	-82.98192
CADILLAC GAGE DIV OF TEXTRON	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009596277	42.4835	-82.97698
MIDAS MUFFLER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003677254	42.48351	-82.94584
HOME DEPOT USA INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003687341	42.48377	-83.00629
TUFF MACHINE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003654643	42.483802	-82.976757
CITY OF WARREN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015879717	42.48392	-82.98067
LAKEVIEW PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015902399	42.48418	-82.91261
STA-BRITE PLATING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009597766	42.48491	-82.97593
BODY BY BRUCE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003631142	42.48507	-82.98071
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887281	42.48511	-82.92742
GOLLING ROSEVILLE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003623918	42.4853	-82.94422
KEITH BOVENSCHEN SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070594815	42.48535	-82.99736
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887995	42.48556	-82.92744
J AND L COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001843550	42.48558	-82.94449
W W GRAINGER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121037	42.48573	-82.97532
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045980131	42.485735	-83.006336
FRANKS COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003600470	42.48579	-82.98695
ADVANCED TRANSPORTATION CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015885265	42.48581	-82.98267
CADILLAC PRODUCTS AUTOMOTIVE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015800766	42.48604	-82.97934
IAC WARREN LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022927733	42.48604	-82.97934
MAGNA MODULAR SYSTEMS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636370	42.486042	-82.979378
MARTINREA HOT STAMPINGS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003697786	42.48619	-82.97713
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575140	42.48639	-82.89894
ELITE MOTOR SALES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015809393	42.4864	-82.97419
CHEMICAL TECHMOLOGY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066957706	42.48688	-82.97446
MINIT-LUBE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646859	42.48691	-82.94361
PERRY DRUG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066970656	42.48692	-82.94316
KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037416392	42.48721	-83.0064
KMART CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042282810	42.48724	-82.94242
CITY OF ROSEVILLE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636101	42.4873	-82.94047
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015806181	42.48739	-82.89668
CALIFORNIA COLLISION EXPERTS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039566859	42.487511	-82.943222
BETHEL LUTHERAN CHURCH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003640463	42.48792	-82.90739
KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037410110	42.48822	-82.9423
WARREN ENGINE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042286442	42.48822	-82.97345
JM INDUSTRIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003701067	42.488226	-82.977242
MORAN FOODS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064380450	42.48868	-82.94201
MICHIGAN INDUSTRIAL PAINT SUPPLY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003712457	42.4887	-82.97309
WOLVERINE LAWN EQUIPMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064381262	42.48884	-82.897868

Site Name	Type	ID	Latitude	Longitude
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064664689	42.48885	-82.9419
THE SHERWIN WILLIAMS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003573259	42.4891	-82.93973
MIDWEST BRAKE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003615437	42.48927	-82.97267
FLEX-N-GATE FORMING TECHNOLOGIES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009600413	42.4898	-82.97227
HARRY & SONS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006412612	42.48994	-82.9773
THERMOPLASTICS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003601898	42.489982	-82.972133
SHELL OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003692460	42.49039	-82.97183
KARG AUTOMOTIVE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003642274	42.4904	-82.94133
CONSUMERS ENERGY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022927635	42.49052	-82.97173
ARKAY-WALKER PAINT COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121046	42.49088	-82.89725
ARDMORE SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110026621403	42.49091	-82.89239
LAPARI FOODS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044821440	42.49099	-82.97733
ONE HOUR MARTINIZING OF EASTGATE LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003604298	42.49112	-82.94086
GROESBECK COMMERCE PARK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006413130	42.49136	-82.9711
EXXONMOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003657533	42.49138	-83.00656
LEX WARREN LP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110069511718	42.49142	-82.97734
TARPON AUTOMATION AND DESIGN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001846218	42.491501	-82.970992
DISTINCTIVE MOTORCARS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003639206	42.491554	-82.977347
CONNOR CLEANER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003699837	42.49163	-82.8973
DAWN DONUTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007577318	42.49168	-83.00575
SUN DESIGN AND DEVELOPMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003615847	42.49177	-82.97079
POLE POSITION AUTO BODY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046258170	42.491962	-82.97736
PPG PITTSBURGH PAINTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042187291	42.492044	-82.989353
NAKED FURNITURE SHOP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003566267	42.49207	-82.93977
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045978956	42.4921	-82.9881
SPINA ELECTRIC CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001300048	42.49221	-82.97046
KRAUSS MAFFEI CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043413561	42.49235	-82.98439
PROPER MOLD AND ENGINEERING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007579520	42.49249	-82.98262
ROSEVILLE COMMUNITY SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044819532	42.49263	-82.94841
EMERGENCY FLEET SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021011199	42.49264	-82.98079
COMCAST	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020892168	42.49267	-82.90755
AMERICAN INDUSTRIAL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020486400	42.49285	-82.97841
BUDGET AUTO CARE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024550966	42.49316	-82.93952
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058887003	42.49318	-83.00658
JAC PRODUCTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007585719	42.49324	-82.97385
PREFERRED FILTER RECYCLING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020482235	42.49328	-82.97352
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574793	42.49345	-82.93932
MORISETTE AUTOMOTIVE IV INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003677619	42.49345	-82.89744
MI DEPT/TRANSPORTATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007594059	42.49386	-82.96783
FLEX-N-GATE MICHIGAN LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042280402	42.49432	-82.96888
AERO GRINDING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056377184	42.4944	-82.96628
DETROIT PLASTIC MOLDING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002472280	42.49441	-82.96573
PAUL MURPHY PLASTICS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007586914	42.49444	-82.96434
WARREN WOODS SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015904093	42.49459	-82.98714
M & G SHORES CLEANERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003618988	42.49477	-82.89754
HOME QUARTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015878148	42.494897	-82.934367
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574150	42.49498	-82.90763
OCULOPLASTIC, ORBITAL & NEURO-OPHTHALMIC SURGERY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412811	42.49509	-82.98715
WENTWORTH ACQUISITIONS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633337	42.49512	-82.96825
PERFECTION MOLDING AND FINISHING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003612172	42.49529	-82.97224
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007578692	42.495358	-82.937586
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007580714	42.49539	-82.90805
HENLEY BLUEWATER LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003666792	42.49547	-82.8976
BEAUMONT FAMILY MEDICINE CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412651	42.49572	-82.89895
UNITED RESIN CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003596500	42.49575	-82.97534
AMERIPATH	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024255562	42.49577	-82.98716
IDJ AUTOMOTIVE MACHINE SHOP INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003596387	42.49586	-82.96769
UNIVERSAL PLASTIC INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001847315	42.49587	-82.97271
ST CLAIR SHORES POLICE DEPARTMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044810602	42.49588	-82.8888
DOCTORS CLINIC PC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020893087	42.496048	-82.89627
COSTCO WHOLESALE - ROSEVILLE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003697232	42.49609	-82.93714
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003673212	42.49635	-82.89765
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045977332	42.4966	-82.89766
HOP IN FOOD STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003662037	42.49662	-82.96711
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003612109	42.49681	-82.93667
GLOBAL ELECTRIC ELECTRONIC PROCESSING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110032749113	42.49682	-82.9723
DUROSS PAINTING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003639288	42.49698	-82.97231
AAA LIFT TRUCK SERVICES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031330021	42.4971	-82.97231
ARCHITECTUAL WOODWORKS & CABINETS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022927458	42.49716	-82.9667
LAKEVIEW SCHOOL DISTRICT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016741276	42.49724	-82.90958
WOLVERINE RUBBER DIV	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003647144	42.49736	-82.97233
LAKEVIEW PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015808036	42.49771	-82.91211
FREEMAN MANUFACTURING & SUPPLY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015887012	42.49775	-82.96626
KOCH AUTOMOTIVE PRODUCTS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001441173	42.49779	-82.97237
AUTO INTERNATIONAL COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003615044	42.49783	-82.93646
ROSEVILLE COMMUNITY SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043186021	42.49811	-82.95198
ROBERTS AND SON BLACK OXIDE SPEC INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579663	42.49812	-82.96599
FRANKLIN BANK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003610539	42.49826	-82.96588
JAC PRODUCTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003666621	42.49847	-82.97242
PENISULAR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003644940	42.49849	-82.96571
BIX FURNITURE SERVICE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003668166	42.49896	-82.89775
J & L INDUSTRIAL SUPPLY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021011607	42.49912	-82.96525
BRUSH WELLMAN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001840624	42.49953	-82.96927
DETROIT SPECTRUM PAINTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044975266	42.49953	-82.96927
CAN-LAB LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070680783	42.49974	-82.96928
MINOWITZ MFG CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000890545	42.49984	-82.96473
PRESSURE VESSEL TECHNOLOGIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015807108	42.5	-82.96929
NORTHWAY INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003608551	42.50017	-82.96448
ARTHUR VICTOR PAINTING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003711751	42.50022	-82.90787
SAFETY ENGINEERING LABORATORIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003705223	42.50029	-82.9693
WARREN WOODS PUBLIC SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020485802	42.50033	-82.97765
ASTRO CENTERLESS GRINDING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003571572	42.50036	-82.9693
COLLEGE PARK INDUSTRIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003628593	42.50088	-82.96932
JOHN AND JEAN DROSTE TIRE DISTRIBUTORS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003566123	42.50141	-82.96358
R G S CONTRACTING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015807493	42.50154	-82.96774
WOLVERINE CARBIDE AND TOOL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044817543	42.50155	-82.96708
FUTURE TOOL & GAGE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037397796	42.501629	-82.961489
PREMIER FINISHES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110032636958	42.502109	-82.963051
POINTE AUTOMATIC TRANSMISSION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024551162	42.50241	-82.89788
EKMER CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597929	42.502452	-82.962792
KNIGHT ENTERPRISES-ROSEVILLE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003679984	42.50246	-82.93345
WENTWORTH ACQUISITION LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003580189	42.50253	-82.96273
CONWAY DETROIT CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110046529832	42.50261	-82.96798
HUSKY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003585781	42.50285	-82.96799
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574766	42.50288	-82.8979
G DINO TOLIAS DDS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110069285623	42.502881	-82.907981
MOON ROOF CORP OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002117049	42.50301	-82.96237
ARCHDIOCESE OF DETROIT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067418011	42.503169	-82.882852

Site Name	Type	ID	Latitude	Longitude
ROSEVILLE CLOCK SHOP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015801140	42.50326	-82.93292
WEBSTER ENGINEERING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003632301	42.5037	-82.96185
SUNOCO INC (R&M)	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037403529	42.50406	-82.93195
NBC TRUCK EQUIPMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003663287	42.50416	-82.9615
V K BORING & MACHINE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015837790	42.50457	-82.96119
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006411347	42.5047	-82.93152
ROSEVILLE COMMUNITY SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043183346	42.50578	-82.92673
VETTE SHOP EAST INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003601022	42.50608	-82.93108
UNCLE EDS OIL SHOPPE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646458	42.50651	-82.89817
CITY OF SAINT CLAIR SHORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015887575	42.50707	-82.88149
RAINBOW FABRICARE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003598615	42.50748	-82.93485
MACOMB DUPLICATING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003600407	42.50765	-82.93495
LAFATA AUTO BODY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003605910	42.50832	-82.93533
WOODWARD DETROIT CVS, LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045977573	42.50846	-82.92908
G I MEDICINE ASSOCIATES PC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110040449280	42.50864	-82.90826
KOBO CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003590953	42.50909	-82.93577
PROFESSIONAL AUTO CTR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003673819	42.50937	-82.93593
CONSUMERS ENERGY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022471430	42.50941	-82.945912
WAL MART STORES EAST LP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015871859	42.50945	-82.92844
EXXONMOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007577602	42.5097	-82.92828
JOHN M STEINBERG DDS PC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044816697	42.50972	-82.89829
MINIT-LUBE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646993	42.50984	-82.90832
SPEEDWAY 8838-ROSEVILLE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003685922	42.50984	-82.9362
MCLAREN MACOMB FAMILY & INTERNAL MEDICINE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064016648	42.50991	-82.92515
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574784	42.51001	-82.92853
LENSCRAFTERS #5572	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037408347	42.51005	-82.8983
APCO OIL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044975701	42.51006	-82.91694
WALGREEN CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056376693	42.51008	-82.8983
MOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007576587	42.51024	-82.90763
MICHIGAN INSTITUTE OF UROLOGY PC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024443896	42.51026	-82.90665
ARNOLD LINCOLN-MERCURY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003590070	42.51068	-82.92763
COLLEX COLLISION EXPERTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003676978	42.51107	-82.92784
CENTURY 21 REALTY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015879762	42.51162	-82.89836
SUPREME GEAR CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003660422	42.51346	-82.925
TRI WAY COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003593380	42.51355	-82.92625
INDIAN VILLAGE CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003618602	42.51439	-82.89848
CADILLAC PRODUCTS AUTOMOTIVE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110032731710	42.51527	-82.90856
MODERN MIRROR & GLASS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003572660	42.51531	-82.90623
MOORE SIGNS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579388	42.51532	-82.90568
ROSEVILLE COMMUNITY SCHOOLS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412615	42.51532	-82.93353
TED'S AUTO BODY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574141	42.51562	-82.89853
CITY OF ROSEVILLE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003636094	42.51569	-82.924868
THOMAS CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003689937	42.51593	-82.89854
WM. BEAUMONT HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058886718	42.51622	-82.90857
K & K PRECISION LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022471154	42.51673	-82.90859
CITY OF ROSEVILLE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020485045	42.516922	-82.927171
NORRIS GRAPHICS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003566276	42.5185	-82.92309
COMERICA BANK	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043413204	42.518705	-82.922955
CITY OF ST CLAIR SHORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015893112	42.51881	-82.87786
ALBERTO CULVER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037407400	42.51948	-82.92196
FOAM CRAFT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003686823	42.51982	-82.90873
LAFATA AUTO BODY EAST LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054839699	42.52032	-82.90874
US POSTAL SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003703252	42.52074	-82.92113
UNITEC INDUSTRIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015807901	42.521161	-82.911929
L H COTE CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003698883	42.52117	-82.87717
ACAL UNIVERSAL GRINDING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038871593	42.521173	-82.911478
TUFF KOTE DINOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003602735	42.52188	-82.91873
US POSTAL SERVICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003704251	42.522295	-82.920107
TOM AND JERRYS COLLISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003593521	42.52236	-82.8768
AUTOZONE STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044975006	42.52245	-82.89883
MCCULLAGH GE CAPITAL FLEET SVC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003561146	42.522506	-82.908838
HISTOLOGY ASSOC INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008456722	42.52303	-82.88107
MEIJER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003632276	42.52305	-82.90886
FOREST CITY 1 HOUR MARTINIZING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003619013	42.52328	-82.91997
FOREST CITY CONSTRUCTION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007576925	42.52328	-82.91997
JEFFREY AUTOMOTIVE GROUP, INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607856	42.52353	-82.91931
GENERAL ELECTROSTATIC CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003614991	42.52364	-82.89081
BED BATH AND BEYOND #0166	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044923223	42.52379	-82.91964
AUTO MARKETING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003672062	42.52396	-82.89836
KROGER #018-455	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037413466	42.524029	-82.919484
KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037415589	42.524381	-82.897982
ROSEVILLE FAMILY PHYSICIANS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043311118	42.52468	-82.921848
HOME DEPOT USA INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007595682	42.524873	-82.911774
PENSKE AUTO CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007587094	42.52492	-82.90513
KMART CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008448803	42.52492	-82.90513
THE KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067268753	42.52492	-82.90513
DAWN DONUTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044974711	42.52493	-82.90935
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064663500	42.524932	-82.907012
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007583882	42.52494	-82.90829
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045979330	42.525327	-82.897135
GIM LING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044814948	42.52655	-82.895115
SE CORP OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003649918	42.52689	-82.87418
SHADOWOOD AUTO CENTER INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575382	42.52721	-82.91739
U HAUL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003680847	42.52846	-82.91616
CGS AUTO AND TRUCK REPAIR	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003676629	42.52863	-82.91646
SPEEDWAY SUPERAMERICA LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646163	42.52932	-82.90918
GE CAPITOL FRANCHISE FINANCE CORPORATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039567073	42.52991	-82.91562
SAMS EAST INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020486348	42.52997	-82.91514
STAPLES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066970683	42.53104	-82.91444
SAM'S CLUB	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003698286	42.531573	-82.914095
WALGREENS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055930346	42.53177	-82.88875
KUSH PAINT COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110011445052	42.53217	-82.92027
7-ELEVEN INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042286095	42.53233	-82.90985
SHELL OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008455518	42.532454	-82.888196
CITY OF SAINT CLAIR SHORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015888770	42.53246	-82.90362
MASONIC MEDICAL CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412508	42.53246	-82.90362
PETCO STORE #1959	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110056319247	42.53301	-82.91315
MICHAELS STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055447823	42.53305	-82.913123
CITGO PETROLEUM	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003595761	42.53312	-82.91354
SEARS OPERATIONS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110009394084	42.53312	-82.91354
PEARLE VISION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038871058	42.533177	-82.919317
TOYS R US TEAM MGMT GROUP INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003621386	42.533804	-82.912627
KIDDIE KANDIDS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031351999	42.533814	-82.913079
STOCK BROTHERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008445281	42.53406	-82.9096
ZITO TRUCKING CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003585772	42.53447	-82.90963
DICK'S SPORTING GOODS #1177	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110063682457	42.535022	-82.912294
MI DEPT/TRANSPORTATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007581063	42.53515	-82.90373
LENS CRAFTERS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037400755	42.53588	-82.91173

Site Name	Type	ID	Latitude	Longitude
HENRY FORD OPTIMEYES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037397634	42.53639	-82.91094
BELLE TIRE DISTRIBUTORS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003695154	42.53711	-82.91046
AUTOMATIC DIE CAST	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110002117101	42.53728	-82.88437
PLASTECH CORP.	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110000856896	42.53857	-82.88335
FISHER & COMPANY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003653243	42.53912	-82.88978
EQUILON ENTERPRISES LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584462	42.53928	-82.9095
SAVAIR INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003579299	42.539513	-82.887465
BINDERLINE DEVELOPMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003675265	42.539681	-82.885407
ATSALIS BROTHERS PAINTING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007584140	42.54004	-82.89261
HENRY FORD HEALTH SYSTEM DBA HENRY FORD HOSPITAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121182	42.54018	-82.90846
WASTE MANAGEMENT-DETROIT EAST	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015833080	42.54135	-82.88631
MARINE MACHINING & MFG LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037401166	42.54171	-82.88749
CLASSIC COLLISION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003715686	42.54176	-82.88749
UNCLE EDS OIL SHOPPE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006410776	42.54184	-82.90783
WITKO GROUP INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003621279	42.54228	-82.90753
VACUCOAT TECHNOLOGIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044814644	42.54261	-82.88752
DYNAMIC METALS GROUP LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121263	42.54365	-82.88979
MCLAREN MEDICAL MANAGEMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064101760	42.54389	-82.87904
OLD CLUB-HARSENS ISLAND	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006743104	42.54461	-82.66415
GROSSE POINTES-CLINTON REFUSE DISPOSAL AUTHORITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003593148	42.54534	-82.88985
CLINTON POINTE SHOPPING CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015894772	42.545606	-82.904886
PIERBURG INSTRUMENTS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003562396	42.546054	-82.877269
ADVANCE AUTO PARTS 8604	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044820398	42.5464	-82.90481
TARGET STORE T0819	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045450070	42.54651	-82.90428
WOODWARD DETROIT CVS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067422211	42.54651	-82.90428
PEP BOYS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003695608	42.54682	-82.90453
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042283098	42.5469	-82.90402
KMW CHEMICALS/LUBRICANTS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031340715	42.5473	-82.89888
INTERNATIONAL TRANSMISSION COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017224644	42.54746	-82.89124
EFFICIENT SANITATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003634247	42.54765	-82.88406
ZENITH INDUSTRIAL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006514370	42.54778	-82.87826
MICHIGAN BELL TELEPHONE COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006517082	42.54811	-82.90323
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003575453	42.54937	-82.90284
AMERICAN OIL ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015800800	42.55024	-82.87388
T J MOBIL SVCS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003568513	42.55062	-82.9016
DATTA ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003692479	42.55062	-82.9016
BILL LEE OLDSMOBILE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006516920	42.55068	-82.902
JVIS USA LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110001682867	42.55082	-82.87341
MECURY PLASTICS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003623311	42.55082	-82.87341
MARIO'S BODY SHOP INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003591710	42.55154	-82.90152
AFTERMARKET SYSTEMS INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031299002	42.552366	-82.882065
WARREN INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015836620	42.55246	-82.88333
EXTRUSIONS TECHNOLOGIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008456198	42.552473	-82.882963
BEAR FLUID POWER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110016717819	42.55248	-82.88269
COUNTY OF MACOMB ROAD COMMISSION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003694306	42.55292	-82.88086
BELL FORKLIFT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015901853	42.55315	-82.88271
CONWAY DETROIT CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003613313	42.55336	-82.88087
MODERN ENGINEERING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003558935	42.55361	-82.88088
PHYDEAUX ENTERPRISES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015888850	42.55397	-82.88089
A&F ENGINEERING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037398438	42.55409	-82.88089
CONSUMERS ENERGY CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022471724	42.554202	-82.85433
DANDY OIL STATION 3	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008440712	42.55451	-82.90973
CARNAGHI LEONARD C INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003678912	42.55469	-82.86581
KATECH INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003607473	42.55485	-82.86654
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574187	42.55489	-82.87028
ADELL BROADCASTING CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031411602	42.554947	-82.887288
REPUBLIC LINEAR SHAFTING LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110017617257	42.55496	-82.8866
PHILS AUTOMOTIVE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015844050	42.554974	-82.886099
M & M TURNING CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003563331	42.55502	-82.8673
SMART MACOMB TERMINAL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110008450951	42.55503	-82.88384
DIAGNOSTIC IMAGING INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007580377	42.55507	-82.88182
SUNOCO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003644691	42.55509	-82.89917
CHURCH OF CHRIST ASSISTED LIVING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066968614	42.555214	-82.873857
AFFILIATED PLASTICS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003713731	42.55524	-82.88384
TITAN COATINGS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038258596	42.555299	-82.886393
FAST TRACK VENTURES ACQUISITIONS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003652887	42.5556	-82.85297
VERSA-CRAFT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110070121070	42.5556	-82.88385
PERRY DRUG STORES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110066971646	42.55576	-82.89882
TENIBAC GRAPHION INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003656311	42.5558	-82.88386
LOWE'S HOME CENTERS LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110021011055	42.55583	-82.89922
OAKLEY INDUSTRIES INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003691201	42.55586	-82.88386
MONTGOMERY WARDS AUTO EXPRESS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003681935	42.55625	-82.899
MONTGOMERY WARD AND CO INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003672730	42.556332	-82.899172
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064379836	42.55635	-82.87012
MACOMB SHEET METAL INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022925352	42.55636	-82.88138
DATUM PRECISION MACHINE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037412047	42.556404	-82.883869
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064667917	42.556526	-82.898411
AUTO CON CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003633131	42.556853	-82.864405
SPEEDWAY SUPERAMERICA LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003646136	42.55695	-82.87013
US DEPT/HOMELAND SECURITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003572642	42.557243	-82.642706
MORAN CHEVROLET INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003614492	42.55727	-82.898
CHARTER TOWNSHIP OF CLINTON	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006410865	42.55732	-82.86743
FRICTION CONTROL LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044923964	42.55746	-82.88142
THE SHERWIN WILLIAMS COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037405064	42.558161	-82.897983
THE SHERWIN WILLIAMS CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003574356	42.558407	-82.897853
TREND PERFORMANCE PROD INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003639279	42.55889	-82.88313
CCF AUTO BODY INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045408938	42.5593	-82.89693
GEORGES CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110054842649	42.55965	-82.87021
LAWRENCE OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110038872663	42.56006	-82.87024
DORIAN FORD	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003623106	42.56042	-82.89633
J M MARCH SERVICE STATION	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015880297	42.564393	-82.894642
HIDDEN HARBOR MARINA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006515734	42.56483	-82.8441
AFFORDABLE COLLISION WORKS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064380156	42.56492	-82.89436
NORMANDY FAMILY PHYSICIANS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110043412820	42.565132	-82.871049
SHELL OIL COMPANY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007579744	42.565284	-82.893742
MCLAREN MEDICAL MANAGEMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110055447002	42.56591	-82.89339
SPEEDWAY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110022919564	42.56625	-82.84253
MOUNT CLEMENS REGIONAL MEDICAL CENTER	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058888173	42.566455	-82.871404
NU APPEARANCE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003561495	42.56679	-82.84194
AUTOZONE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110020892907	42.5674	-82.89303
AMOCO OIL CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003654091	42.56854	-82.89242
PRECISION TUNE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006411971	42.56869	-82.87168
NEHME INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003651398	42.56885	-82.87167
SERVICES SPECIALTIES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015926514	42.56891	-82.83961
AUTO BODY SERVICE CENTERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110013385452	42.56893	-82.87167
HAYEM ENTERPRISES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110044815956	42.56893	-82.84651
MT CLEMENS GEN HOSP ADMIN BLDG	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015914885	42.56948	-82.8908
MCLAREN MEDICAL MANAGEMENT INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110058886772	42.56948	-82.8908

Site Name	Type	ID	Latitude	Longitude
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110039573583	42.57012	-82.867245
KROGER CO OF MICHIGAN	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110037415650	42.570371	-82.848952
CVS PHARMACY #8095	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110045978411	42.570687	-82.849481
JEFFERSON MOTOR SVC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006514520	42.57109	-82.83461
EXXONMOBIL OIL CORP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110007577666	42.57159	-82.87154
ST JOHN MEDICAL CENTER - HARRISON TOWNSHIP	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024546507	42.571595	-82.851004
HARBOR CLUB NORTH MARINA	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015926694	42.57169	-82.82667
US DEPT/HOMELAND SECURITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110024548890	42.57181	-82.81184
BANK ONE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015914153	42.57229	-82.87151
METRO DRY CLEANERS	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003597554	42.572503	-82.871494
AMERIMAC LC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003640089	42.572646	-82.871486
AMERICAN DRY CLEANING	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003689161	42.572674	-82.871485
FAMILY DOLLAR STORES	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110064667748	42.573221	-82.871455
HURON CLINTON METROPARKS AUTHORITY	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003628138	42.573805	-82.798302
L'ANSE CREUSE HIGH SCHOOL	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110036794555	42.58191	-82.85278
MICHIGAN BELL TELEPHONE CO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110042415473	42.58267	-82.56153
MI DEPT/STATE POLICE	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110031393622	42.5847	-82.80991
MI DEPT/NATURAL RESOURCES AND ENVIRONMENT	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003629093	42.587803	-82.580549
MICHIGAN MARINE SALVAGE INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110006411597	42.5931	-82.78656
JOSEPH ARCHANGELO	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110015811647	42.5931	-82.78656
CW MANAGEMENT COMPANY LLC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110067417691	42.59384	-82.78122
BOCA GRANDE MARINA INC	Part 111, NREPA - Haz. Waste Treatment, Storage, and Disposal Facility	110003688947	42.59399	-82.77933
CITY OF DETROIT	Toxic Substances Control Act of 1976	110011587657	42.38087	-82.97579
PVS TECH INC	Toxic Substances Control Act of 1976	110000406784	42.395228	-82.996228
PVS CHORALKALI	Toxic Substances Control Act of 1976	110064827683	42.39556	-82.99536
PVS CHEMICAL SOLUTIONS, INC	Toxic Substances Control Act of 1976	110069540866	42.39556	-82.99536
DETROIT WATER AND SEWERAGE - CITY OF DETROIT	Toxic Substances Control Act of 1976	110009599924	42.39757	-83.03428
DETROIT PUBLIC LIGHTING DEPT	Toxic Substances Control Act of 1976	110003643004	42.40118	-83.00995
CROWN GROUP, LYNCH ROAD PLANT	Toxic Substances Control Act of 1976	110011585301	42.40477	-83.03651
WINSTON-MORROW CORP	Toxic Substances Control Act of 1976	110010592527	42.41415	-83.03816
ALPHA RESINS INC	Toxic Substances Control Act of 1976	110056954434	42.42183	-83.06259
US EQUIPMENT	Toxic Substances Control Act of 1976	110003690435	42.44865	-83.0052
STANDARD LEAD CO INC	Toxic Substances Control Act of 1976	110010737836	42.45166	-83.00534
ENTHONE OMI INC	Toxic Substances Control Act of 1976	110000405320	42.45406	-83.0054
FCA US LLC WARREN TRUCK ASSEMBLY PLANT	Toxic Substances Control Act of 1976	110000405393	42.45544	-83.040949
HENKEL CORPORATION	Toxic Substances Control Act of 1976	110000405366	42.46582	-83.03541
MITSUBISHI CHEMICAL PERFORMANCE POLYMERS INC	Toxic Substances Control Act of 1976	110003594673	42.47112	-83.006
EAST DETROIT PUBLIC SCHOOLS	Toxic Substances Control Act of 1976	110011595871	42.47142	-82.97969
MB AEROSPACE WARREN	Toxic Substances Control Act of 1976	110003700139	42.48118	-82.97598
GROSSE POINTE PARK CSO	NPDES Permit	110042390249	42.372778	-82.938333
CITY OF GROSSE POINTE PARK	NPDES Permit	110031271291	42.37584	-82.93738
GROSSE POINTE MS4-WAYNE	NPDES Permit	110069485097	42.38624	-82.91166
GROSSE POINTE WAR MEMORIAL	NPDES Permit	110042389233	42.38779	-82.8984
PVS TECHNOLOGIES	NPDES Permit	110064591990	42.39556	-82.99536
UPPER ROUGE TUNNEL PROJECT	NPDES Permit	110038110120	42.40365	-82.93639
GROSSE POINTE FARMS	NPDES Permit	110040046811	42.40638	-82.89257
GROSSE POINTE FARMS MS4-WAYNE	NPDES Permit	110069477587	42.40638	-82.89257
VILLAGE OF GROSSE POINTE SHORE	NPDES Permit	110007597458	42.43615	-82.87602
GROSSE POINTE SHORES CSO	NPDES Permit	110042383729	42.43615	-82.87602
ABC MURRAY SPROCKETS	NPDES Permit	110067573986	42.44828	-83.03341
SLC RECYCLING INDUSTRIES INC	NPDES Permit	110061851660	42.44872	-83.01534
MILK RIVER CSO RTB	NPDES Permit	110006740624	42.44893	-82.89108
FCA US LLC WARREN TRUCK ASSEMBLY PLANT	NPDES Permit	110000405393	42.45544	-83.040949
GRAND TRUNK WRR-CARGFLO YARD	NPDES Permit	110067561864	42.45624	-83.00197
GLE SCRAP	NPDES Permit	110039564085	42.45865	-83.03487
BAR PROCESSING CORP	NPDES Permit	110067613229	42.46143	-82.99341
WOLVERINE DIE CAST-HOOVER RD	NPDES Permit	110006649083	42.46147	-83.00561
WEYERHAEUSER CO	NPDES Permit	110008447136	42.46375	-82.99404
METRO INTERNATIONAL TRADE	NPDES Permit	110067631959	42.46375	-82.99404
LYONS TOOL & ENGINEERING INC	NPDES Permit	110067583939	42.46389	-82.98411
CHAPATON RETENTION TREATMENT BASIN	NPDES Permit	110039714994	42.46544	-82.88522
HENKEL CORPORATION	NPDES Permit	110000405366	42.46582	-83.03541
FEDERAL SCREW	NPDES Permit	110064611978	42.465881	-82.914205
ALUDYNE US LLC	NPDES Permit	110067619937	42.465883	-82.996012
J & L MFG CO	NPDES Permit	110067633467	42.46683	-82.98628
EASTPOINTE MS4-MACOMB	NPDES Permit	110069473251	42.46819	-82.95545
PASLIN COMPANY	NPDES Permit	110069488174	42.46838	-83.00591
IROQUOIS INDUSTRIES INC-WARREN	NPDES Permit	110070204849	42.47005	-82.9925
M&M BLANCHARD GRINDING	NPDES Permit	110070146401	42.47063	-83.00933
CERATIZIT USA INC 11530	NPDES Permit	110070155103	42.47068	-83.00728
WARREN SCREW PRODUCTS INC	NPDES Permit	110038716501	42.47106	-82.99063
PIONEER METAL FINISHING	NPDES Permit	110009395779	42.471064	-82.989852
ACME HOLDING CO	NPDES Permit	110067587533	42.47285	-83.01096
MAXI-GRIP INC	NPDES Permit	110067576304	42.47703	-83.0023
MDEQ-RRD-ST CLAIR SHORES GWCU	NPDES Permit	110070555976	42.47921	-82.88066
L & M MACHINING & MFG INC	NPDES Permit	110008443657	42.47979	-82.94418
MB AEROSPACE WARREN	NPDES Permit	110003700139	42.48118	-82.97598
GFL - WARREN TRANSFER STATION	NPDES Permit	110070263924	42.48392	-82.98067
WARREN RECYCLING CENTER	NPDES Permit	110070621615	42.48392	-82.98067
LAKEVIEW PUBLIC SCHOOLS	NPDES Permit	110015902399	42.48418	-82.91261
LAKEVIEW PS MS4-MACOMB	NPDES Permit	110069483393	42.48418	-82.91261
MARTIN RTB	NPDES Permit	110006740615	42.485258	-82.893082
MAGNA-WARREN BUSINESS CENTER	NPDES Permit	110069995444	42.486042	-82.979378
MID CITY TRUCK PARTS	NPDES Permit	110067635535	42.48767	-82.97387
ST CLAIR SHORES MS4-MACOMB	NPDES Permit	110006649779	42.49562	-82.88848
QUAD INDUSTRIES INC	NPDES Permit	110055094213	42.49575	-82.97534
PENINSULAR CYLINDER CO LLC	NPDES Permit	110067618821	42.49849	-82.96571
COLLEGE PARK INDUSTRIES	NPDES Permit	110003628593	42.50088	-82.96932
AMERICAN TRANSIT MIX INC	NPDES Permit	110067596177	42.50154	-82.96774
FORMER AMOCO STA - 5374	NPDES Permit	110033630426	42.5019	-82.9338
KNIGHT ENTERPRISES-ROSEVILLE	NPDES Permit	110003679984	42.50246	-82.93345
SPEEDWAY 5496-ROSEVILLE	NPDES Permit	110056978034	42.5047	-82.93152
FORMER MOBIL STA 03-G4A	NPDES Permit	110031108414	42.5097	-82.92828
SPEEDWAY 8838-ROSEVILLE	NPDES Permit	110003685922	42.50984	-82.9362
HY&Y INC.	NPDES Permit	110070568358	42.51078	-82.89832
CADILLAC PROD AUTO-ROSEVILLE	NPDES Permit	110067633476	42.51527	-82.90856
ROSEVILLE MS4-MACOMB	NPDES Permit	110069490713	42.51586	-82.92476
CLANCY EXCAVATING CO	NPDES Permit	110045483838	42.51728	-82.90861
FOREST CITY 1 HOUR MARTINIZING	NPDES Permit	110003619013	42.52328	-82.91997
AUTOMATIC DIE CAST	NPDES Permit	110002117101	42.53728	-82.88437
OLD CLUB-HARSENS ISLAND	NPDES Permit	110006743104	42.54461	-82.66415
JVIS USA LLC HARPER	NPDES Permit	110067632985	42.55082	-82.87341
SHORES ENGINEERING CO INC	NPDES Permit	110055095098	42.55334	-82.88087
CITY OF MT CLEMENS	NPDES Permit	110042384853	42.565278	-82.8375
CHRYSLER CORP JEFFERSON ASSEMBLY PLANT S	Toxic Release Inventory	110001680949	42.3695	-82.96297
CHRYSLER JEFFERSON NORTH ASSEMBLY PLANT	Toxic Release Inventory	110000406837	42.3716	-82.9686
CONTINENTAL ALUMINUM CO	Toxic Release Inventory	110000767420	42.372172	-82.957735
BUDD COMPANY	Toxic Release Inventory	110000847157	42.38005	-82.96882

Site Name	Type	ID	Latitude	Longitude
NEW MACK VIPER ASSEMBLY	Toxic Release Inventory	110009393049	42.381529	-82.97459
MACK AVENUE ENGINE PLANT	Toxic Release Inventory	110008058341	42.38441	-82.98197
CHRYSLER MACK AVENUE ENGINE PLANT COMPLEX	Toxic Release Inventory	110009395207	42.387983	-82.981838
DYNECOL INC	Toxic Release Inventory	110000406668	42.39353	-83.03255
PVS TECH INC	Toxic Release Inventory	110000406784	42.395228	-82.996228
MASCOTECH SPECIAL VEHICLES	Toxic Release Inventory	110003645093	42.399	-83.03763
DETROIT FORGE & FNDY.	Toxic Release Inventory	110009596375	42.400275	-83.027972
MICHIGAN CHROME & CHEMICAL COMPANY	Toxic Release Inventory	110000700741	42.40094	-83.01679
DTE ELECTRIC COMPANY	Toxic Release Inventory	110002118002	42.40477	-83.0362
CROWN GROUP LYNCH RD	Toxic Release Inventory	110069253060	42.40477	-83.03651
CHRYSLER LLC - DETROIT AXLE	Toxic Release Inventory	110000407104	42.40488	-83.03037
BAKER & COLLINSON INC	Toxic Release Inventory	110000406702	42.4117	-83.03812
MAC CASTINGS	Toxic Release Inventory	110070691681	42.4161	-83.03453
CADILLAC OIL COMPANY	Toxic Release Inventory	110000406711	42.41709	-83.03089
RIM CUSTOM RACKS	Toxic Release Inventory	110000406775	42.41924	-83.03521
AMERICAN STEEL CORP	Toxic Release Inventory	110000779890	42.41938	-83.02936
RAMPART INDUSTRIES INC	Toxic Release Inventory	110001130133	42.420445	-83.062554
LEAR CORP DETROIT	Toxic Release Inventory	110000406766	42.42091	-83.05707
ALPHA RESINS INC	Toxic Release Inventory	110056954434	42.42183	-83.06259
METROPOLITAN ALLOYS	Toxic Release Inventory	110070690024	42.42199	-83.06258
FITZGERALD FINISHING LLC	Toxic Release Inventory	110000494037	42.42206	-83.03707
HOOVER TREATED WOOD PRODUCTS, INC.	Toxic Release Inventory	110000406720	42.42355	-83.02612
SPARTAN METAL FINISHING CO	Toxic Release Inventory	110002454647	42.42617	-83.04904
CROWN GROUP	Toxic Release Inventory	110064164933	42.43368	-83.03844
U-METCO INC	Toxic Release Inventory	110042281134	42.43413	-83.0165
PGP CORPORATION	Toxic Release Inventory	110000407140	42.43795	-83.03417
FLUID ROUTING SOLUTIONS	Toxic Release Inventory	110000407113	42.44094	-83.03846
DAIMLERCHRYSLER MT ELLIOTT	Toxic Release Inventory	110000407239	42.440983	-83.04028
FCA US CONNER AVENUE ASSEMBLY PLANT	Toxic Release Inventory	110009395387	42.442019	-83.018566
CHAMPION SPARK PLUG CO	Toxic Release Inventory	110027375828	42.442019	-83.018566
SAMUEL-WHITTAR INC	Toxic Release Inventory	110000407131	42.442136	-83.034196
DAIMLERCHRYSLER CORP. MOUND RD. ENGINE PLANT	Toxic Release Inventory	110000407097	42.44444	-83.04382
COOPER HEAT TREATING LLC	Toxic Release Inventory	110000407122	42.445833	-83.035
SUPERIOR MATERIAILS PLANT 02	Toxic Release Inventory	110022810608	42.44779	-83.00518
CARBOLOY INC	Toxic Release Inventory	110018942778	42.44876	-83.01379
3M CO - DETROIT	Toxic Release Inventory	110000593055	42.4489	-83.00238
ENTHONE OMI INC	Toxic Release Inventory	110000405320	42.45406	-83.0054
SAS GLOBAL FKA SURE ALLOY STEEL CORPORATION	Toxic Release Inventory	110039560748	42.45528	-83.01125
FCA US LLC WARREN TRUCK ASSEMBLY PLANT	Toxic Release Inventory	110000405393	42.45544	-83.040949
HOOVER STEEL TREATING CO	Toxic Release Inventory	110000405302	42.455736	-83.005432
NEXEO SOLUTIONS LLC	Toxic Release Inventory	110003683755	42.45624	-83.001954
RING SCREW DIVISION	Toxic Release Inventory	110002456039	42.45777	-83.03484
AJAX METAL PROCESSING INC	Toxic Release Inventory	110000405311	42.45856	-83.00552
WOLVERINE DIE CAST CORP	Toxic Release Inventory	110001843541	42.45868	-83.00221
INVECAST CORP	Toxic Release Inventory	110001846192	42.4613	-83.03343
COLTEC INDUSTRIES INC HOLLEY AUTOMOTIVE DIV	Toxic Release Inventory	110007275732	42.46352	-83.00323
BUNDY CORP	Toxic Release Inventory	110002472422	42.46366	-82.99838
INALFA ROOF SYSTEMS	Toxic Release Inventory	110008443504	42.46369	-82.99725
EAST SIDE CONCRETE WARREN	Toxic Release Inventory	110060259410	42.4643	-82.99127
MORTELL CO	Toxic Release Inventory	110002117218	42.46534	-83.03535
HENKEL CORPORATION	Toxic Release Inventory	110000405366	42.46582	-83.03541
ALUDYNE US LLC	Toxic Release Inventory	110067619937	42.465883	-82.996012
PRODUCTION PLATING FIRE SITE	Toxic Release Inventory	110000404544	42.46751	-82.9559
PPI AEROSPACE	Toxic Release Inventory	110041041315	42.46814	-82.98841
GENTZ IND	Toxic Release Inventory	110002117192	42.46844	-82.98635
CERATIZIT USA, INC.	Toxic Release Inventory	110003579119	42.47066	-83.00791
CADILLAC PLATING CORP	Toxic Release Inventory	110000405268	42.47076	-82.98647
CHASSIX	Toxic Release Inventory	110069234670	42.47099	-82.99483
PIONEER METAL FINISHING	Toxic Release Inventory	110009395779	42.471064	-82.989852
PIONEER METAL FINISHING - STEPHENS ROAD	Toxic Release Inventory	110030740134	42.471064	-82.989852
MITSUBISHI CHEMICAL PERFORMANCE POLYMERS INC	Toxic Release Inventory	110003594673	42.47112	-83.006
PIONEER METAL FINISHING INDUSTRIAL HWY	Toxic Release Inventory	110044359850	42.47636	-82.9895
HI-TECH COATINGS INC	Toxic Release Inventory	110040998383	42.47778	-82.98842
WIDGER GROUP	Toxic Release Inventory	110008443915	42.47841	-82.98478
EFTEC NA LLC	Toxic Release Inventory	110000405286	42.47845	-82.98428
FIBER RESIN CORP	Toxic Release Inventory	110003633961	42.479892	-82.984332
BECKER MANUFACTURING ROSEVILLE DIV.	Toxic Release Inventory	110007274895	42.48004	-82.93451
SURE COAT INDUSTRIES INC	Toxic Release Inventory	110009396144	42.48069	-82.97596
MB AEROSPACE WARREN	Toxic Release Inventory	110003700139	42.48118	-82.97598
CADILLAC GAGE DIV OF TEXTRON	Toxic Release Inventory	110009596277	42.4835	-82.97698
STA-BRITE PLATING INC	Toxic Release Inventory	110009597766	42.48491	-82.97593
BORDEN ITALIAN FOODS	Toxic Release Inventory	110001130160	42.48731	-82.97414
FLEX-N-GATE FORMING TECHNOLOGIES LLC	Toxic Release Inventory	110009600413	42.4898	-82.97227
PEREGRINE METALFORMING INC WARREN OPS	Toxic Release Inventory	110000405348	42.49432	-82.96888
FLEX-N-GATE MICHIGAN LLC	Toxic Release Inventory	110042280402	42.49432	-82.96888
LINCOLN DIE CASTINGS INC	Toxic Release Inventory	110025333299	42.4944	-82.96613
DETROIT PLASTIC MOLDING CO	Toxic Release Inventory	110002472280	42.49441	-82.96573
SHILOH INDUSTRIES	Toxic Release Inventory	110069294864	42.49512	-82.96825
KOCH AUTOMOTIVE PRODUCTS CO	Toxic Release Inventory	110001441173	42.49779	-82.97237
MOON ROOF CORP OF MICHIGAN	Toxic Release Inventory	110002117049	42.50301	-82.96237
AUTOMATIC DIE CAST	Toxic Release Inventory	110002117101	42.53728	-82.88437
PLASTECH CORP.	Toxic Release Inventory	110000856896	42.53857	-82.88335
JVIS USA LLC HARPER	Toxic Release Inventory	110067632985	42.55082	-82.87341
857 Kitchener	Part 201, NREPA - Environmental Remediation	82003110	42.367697	-82.9541383
U.S. Border Patrol	Part 201, NREPA - Environmental Remediation	82002846	42.368992	-82.965488
14326 East Jefferson Avenue	Part 201, NREPA - Environmental Remediation	82006924	42.372148	-82.9449303
1600 ALGONQUIN	Part 201, NREPA - Environmental Remediation	82007315	42.3722	-82.9577
14332 East Jefferson Avenue	Part 201, NREPA - Environmental Remediation	82006948	42.372491	-82.9446996
Continental Aluminum	Part 201, NREPA - Environmental Remediation	82002111	42.372591	-82.957764
14313 East Jefferson Avenue	Part 201, NREPA - Environmental Remediation	82006949	42.372915	-82.9451001
14522 East Jefferson Avenue	Part 201, NREPA - Environmental Remediation	82006934	42.373155	-82.9425986
11200 Charlevoix Street	Part 201, NREPA - Environmental Remediation	82008410	42.373746	-82.9763196
11901 East Jefferson and East 1/2 of St.	Part 201, NREPA - Environmental Remediation	82008408	42.374599	-82.9698722
14701 East Jefferson Avenue	Part 201, NREPA - Environmental Remediation	82008379	42.374631	-82.9410868
2908 Beniteau Street	Part 201, NREPA - Environmental Remediation	82008431	42.374868	-82.9769538
15010 Jefferson	Part 201, NREPA - Environmental Remediation	82002166	42.375166	-82.93787
15316-15324 East Jefferson Avenue	Part 201, NREPA - Environmental Remediation	82003247	42.376666	-82.934381
12141 Charlevoix Street	Part 201, NREPA - Environmental Remediation	82008487	42.3783	-82.9680098
3000 Conner St. Detroit	Part 201, NREPA - Environmental Remediation	82006971	42.37864	-82.9641138
NEGC Conner Campus	Part 201, NREPA - Environmental Remediation	82002677	42.378818	-82.963721
11244 Mack Avenue Detroit	Part 201, NREPA - Environmental Remediation	82008432	42.378899	-82.9785365
4403 St. Jean	Part 201, NREPA - Environmental Remediation	82008376	42.383158	-82.9814351
14636 Charlevoix Street (50006021)	Part 201, NREPA - Environmental Remediation	82003224	42.383657	-82.9477642
12017 Mack Avenue	Part 201, NREPA - Environmental Remediation	82006974	42.383753	-82.9737555
DaimlerChrysler Old Mack	Part 201, NREPA - Environmental Remediation	82001551	42.384002	-82.9780211
10631 E. Warren	Part 201, NREPA - Environmental Remediation	82003021	42.384852	-82.990827
Whittier Cleaners Site, Former	Part 201, NREPA - Environmental Remediation	82002884	42.385022	-82.9441221
Barker/McClellan	Part 201, NREPA - Environmental Remediation	82003022	42.385047	-83.002894

Site Name	Type	ID	Latitude	Longitude
8635 Gratiot Avenue - Part 213	Part 201, NREPA - Environmental Remediation	82006875	42.385212	-83.0106374
12001 Mack Avenue (FAC ID #00020177)	Part 201, NREPA - Environmental Remediation	82007022	42.385251	-82.9746749
Det Multi-Site (13342-13348 Mack)	Part 201, NREPA - Environmental Remediation	82003191	42.38528	-82.9580167
14116 Mack Avenue	Part 201, NREPA - Environmental Remediation	82003238	42.385747	-82.955933
4801 Conner Street Detroit	Part 201, NREPA - Environmental Remediation	82008418	42.386868	-82.9750548
11244 East Warren Avenue	Part 201, NREPA - Environmental Remediation	82008375	42.386996	-82.983939
Mack & Alter-Act 381	Part 201, NREPA - Environmental Remediation	82001882	42.387209	-82.949674
3827-4711 St Jean Street and 11232-11256	Part 201, NREPA - Environmental Remediation	82008417	42.387561	-82.9840208
4737 Conner Avenue	Part 201, NREPA - Environmental Remediation	82007929	42.3877	-82.9718
Detroit Multi-Site (6633 Van Dyke)	Part 201, NREPA - Environmental Remediation	82003139	42.388443	-83.0221671
Detroit Far East Side Redevelop Site	Part 201, NREPA - Environmental Remediation	82001921	42.38877	-82.95589
5066 St. Jean Street	Part 201, NREPA - Environmental Remediation	82007004	42.388771	-82.9838307
8220 Harper Avenue	Part 201, NREPA - Environmental Remediation	82006882	42.388782	-83.0190076
Det Multi-Site (11000 Shoemaker) (213)	Part 201, NREPA - Environmental Remediation	82003148	42.389211	-82.9890073
Shoemaker Former Gas Station	Part 201, NREPA - Environmental Remediation	82002699	42.3894	-82.9963
Shoemaker, 11031	Part 201, NREPA - Environmental Remediation	82001891	42.389439	-82.988953
9200 - 9208 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	82003118	42.38953	-83.0072456
12312 E. Warren	Part 201, NREPA - Environmental Remediation	82003065	42.389785	-82.973673
Det Multi-Site (8355 Van Dyke)	Part 201, NREPA - Environmental Remediation	82003194	42.38991	-83.0226924
16125 Mack Ave.	Part 201, NREPA - Environmental Remediation	82007318	42.3903	-82.9342
2 Cherryhurst Lane	Part 201, NREPA - Environmental Remediation	82002842	42.39122	-82.893294
111 Lakeshore Road	Part 201, NREPA - Environmental Remediation	82007074	42.3914	-82.8929
Rohns, 6633	Part 201, NREPA - Environmental Remediation	82001896	42.392131	-83.012603
Former Gas Station - Part 213	Part 201, NREPA - Environmental Remediation	82003223	42.392347	-82.9563647
St Jean 5664 Buried Drums	Part 201, NREPA - Environmental Remediation	82001497	42.392644	-82.986438
5555 Conner Ave. and 11457 Schoemaker	Part 201, NREPA - Environmental Remediation	82007986	42.3927	-82.9828
I-94 Industrial Park	Part 201, NREPA - Environmental Remediation	82001546	42.393634	-83.033257
6515 6545 Georgia Street & Various Resid	Part 201, NREPA - Environmental Remediation	82008094	42.393899	-83.0331441
10825 Harper	Part 201, NREPA - Environmental Remediation	82003107	42.395441	-82.996049
Meade Group Facility	Part 201, NREPA - Environmental Remediation	82002074	42.395585	-82.902213
11001 Hern Street	Part 201, NREPA - Environmental Remediation	82002977	42.395828	-82.9859313
Det Multi-Site (15010-15016 E. Warren)	Part 201, NREPA - Environmental Remediation	82003147	42.397332	-82.952667
West of Huber Street & Saint Cyril Stre	Part 201, NREPA - Environmental Remediation	82008344	42.397363	-83.0287644
Det Multi-Site (15026 E. Warren)	Part 201, NREPA - Environmental Remediation	82003195	42.39737	-82.9524917
Det Multi-Site (10516 Knodell)	Part 201, NREPA - Environmental Remediation	82003141	42.398891	-82.9988854
6425 Huber	Part 201, NREPA - Environmental Remediation	82003063	42.39904	-83.030768
Sun Up Sun Down Auto Parts	Part 201, NREPA - Environmental Remediation	82001671	42.399477	-82.998691
Airport Trailer Park - Former	Part 201, NREPA - Environmental Remediation	82001628	42.399675	-82.9998381
10644 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	82008525	42.399721	-82.9956365
Det Multi-Site (9524 Saint Cyril)	Part 201, NREPA - Environmental Remediation	82002948	42.399846	-83.0244224
Chrysler Detroit Forge/Winfield	Part 201, NREPA - Environmental Remediation	82001554	42.400489	-83.028163
10533 Gratiot	Part 201, NREPA - Environmental Remediation	82007055	42.400915	-83.0006164
10106 GRINNELL AVENUE	Part 201, NREPA - Environmental Remediation	82007042	42.4011	-83.0036
DaimlerChrysler Detroit Forge Parking Lo	Part 201, NREPA - Environmental Remediation	82001647	42.401241	-83.031383
Sanders Cleaners Warren Ave	Part 201, NREPA - Environmental Remediation	82001932	42.401436	-82.943175
9733 Grinnell Avenue	Part 201, NREPA - Environmental Remediation	82008515	42.401437	-83.0049795
Michigan Chrome & Chemical	Part 201, NREPA - Environmental Remediation	82001675	42.401449	-83.016738
10600 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	82008521	42.401558	-82.9990243
Det Multi-Site (12717 Harper)	Part 201, NREPA - Environmental Remediation	82003190	42.401696	-82.9753598
9455 Grinnell Avenue	Part 201, NREPA - Environmental Remediation	82008250	42.401977	-83.0099799
Corky Holdings, LLC	Part 201, NREPA - Environmental Remediation	82003207	42.402309	-82.9393216
10001 Conner Street	Part 201, NREPA - Environmental Remediation	82008524	42.402738	-82.9963788
3965 & 3973 Caniff	Part 201, NREPA - Environmental Remediation	82002992	42.403669	-83.050068
16602 East Warren Avenue, Detroit	Part 201, NREPA - Environmental Remediation	82008450	42.403933	-82.9347264
10200 Erwin Street	Part 201, NREPA - Environmental Remediation	82007047	42.4044	-83.0183
8081 Lynch Road	Part 201, NREPA - Environmental Remediation	82008467	42.40455	-83.0226945
6334 Lynch Road	Part 201, NREPA - Environmental Remediation	82001555	42.404599	-83.0374422
6490 Lynch	Part 201, NREPA - Environmental Remediation	82003080	42.404839	-83.034657
8200 Lynch Road	Part 201, NREPA - Environmental Remediation	82008539	42.404877	-83.0188124
8247, 8261, 8269 Lynch Road	Part 201, NREPA - Environmental Remediation	82008426	42.40522	-83.0181855
10900-10996 GRATIOT AVENUE	Part 201, NREPA - Environmental Remediation	82007066	42.40555	-82.9967011
8091 Lynch Road	Part 201, NREPA - Environmental Remediation	82008497	42.405641	-83.0208839
6200 Caniff	Part 201, NREPA - Environmental Remediation	82003070	42.405764	-83.041209
6501 Lynch Road	Part 201, NREPA - Environmental Remediation	82008093	42.406439	-83.0331881
18232 Mack Avenue	Part 201, NREPA - Environmental Remediation	82002269	42.407624	-82.914182
Circle Cleaners, 11525 Van Dyke	Part 201, NREPA - Environmental Remediation	82006982	42.407845	-83.0236049
11155 Gratiot	Part 201, NREPA - Environmental Remediation	82006838	42.408315	-82.9956046
17711 E. Warren	Part 201, NREPA - Environmental Remediation	82007362	42.4089	-82.9223
Forest Lawn Memorial Park	Part 201, NREPA - Environmental Remediation	82002040	42.410035	-83.023207
Colloidal Paint Products	Part 201, NREPA - Environmental Remediation	82001981	42.412086	-83.039889
Robins Plating	Part 201, NREPA - Environmental Remediation	82003012	42.412406	-83.037561
13200 Mount Elliot	Part 201, NREPA - Environmental Remediation	82003120	42.414009	-83.0360115
13271 Mt. Elliott Street	Part 201, NREPA - Environmental Remediation	82006947	42.414814	-83.0384622
13445 Girardin	Part 201, NREPA - Environmental Remediation	82003039	42.414951	-83.034456
Helen Avenue Vacant Lot, 13535	Part 201, NREPA - Environmental Remediation	82001541	42.41543	-83.032202
13400 Mount Elliot	Part 201, NREPA - Environmental Remediation	82003038	42.415962	-83.03737
Mary Ann Kulich Property	Part 201, NREPA - Environmental Remediation	82001495	42.416405	-83.058525
13706 Mt. Elliott Street	Part 201, NREPA - Environmental Remediation	82006955	42.416946	-83.0363155
Lara Mini Mart	Part 201, NREPA - Environmental Remediation	82002540	42.417331	-82.972894
General Die Casting	Part 201, NREPA - Environmental Remediation	82000158	42.417535	-83.037454
11350 Kelly Road	Part 201, NREPA - Environmental Remediation	82003116	42.418875	-82.9644717
17125 Conant Street	Part 201, NREPA - Environmental Remediation	82008389	42.418951	-83.0640996
17627 Conant Street, Detroit	Part 201, NREPA - Environmental Remediation	82006977	42.419035	-83.0645973
Plating Equipment Used Inc	Part 201, NREPA - Environmental Remediation	82000045	42.41973	-83.04201
11321 E. McNichols	Part 201, NREPA - Environmental Remediation	82002950	42.420122	-83.0083195
Novo, LLC	Part 201, NREPA - Environmental Remediation	82002839	42.420256	-83.039034
American Vault and Concrete Products	Part 201, NREPA - Environmental Remediation	82002804	42.420692	-83.065224
17236 and 17240 Mount Elliot	Part 201, NREPA - Environmental Remediation	82008475	42.420723	-83.0382951
6501 E McNichols Rd	Part 201, NREPA - Environmental Remediation	82008092	42.420996	-83.0352503
17301 Sherwood	Part 201, NREPA - Environmental Remediation	82003023	42.42105	-83.033838
Southland Corp E McNichols	Part 201, NREPA - Environmental Remediation	82001490	42.421065	-83.002405
Lamont Street Site	Part 201, NREPA - Environmental Remediation	82002793	42.421318	-83.054087
Hantz Farms	Part 201, NREPA - Environmental Remediation	82002826	42.421399	-83.039541
17400 St. Louis	Part 201, NREPA - Environmental Remediation	82003090	42.421895	-83.039333
17201 Annott Avenue	Part 201, NREPA - Environmental Remediation	82007346	42.422	-83.0019332
17400 Conant	Part 201, NREPA - Environmental Remediation	82003124	42.422331	-83.0653294
Peloquin Enterprises Detroit	Part 201, NREPA - Environmental Remediation	82000041	42.422629	-83.041768
6440 East Davison Street	Part 201, NREPA - Environmental Remediation	82008459	42.422674	-83.0360439
Edgeton	Part 201, NREPA - Environmental Remediation	82001630	42.422747	-83.026562
17457 Filer Street	Part 201, NREPA - Environmental Remediation	82008367	42.422888	-83.0374509
17507 Van Dyke Avenue	Part 201, NREPA - Environmental Remediation	82008507	42.423026	-83.024302
6500 East Davison Road	Part 201, NREPA - Environmental Remediation	82008089	42.4233	-83.0358
Integrated Manufacturing & Assembly	Part 201, NREPA - Environmental Remediation	82002624	42.423894	-83.033861
Nortown Community Development Corporatio	Part 201, NREPA - Environmental Remediation	82002693	42.424369	-83.038053
nortown community development	Part 201, NREPA - Environmental Remediation	82002607	42.424492	-83.038868
City of Detroit Vacant Lot	Part 201, NREPA - Environmental Remediation	82002608	42.424619	-83.03808
Det Multi-Site (Master Metals)	Part 201, NREPA - Environmental Remediation	82001564	42.425673	-83.055825
5820 E. Nevada	Part 201, NREPA - Environmental Remediation	82003106	42.425709	-83.044024

Site Name	Type	ID	Latitude	Longitude
Lear Corporation - 6501 East Nevada	Part 201, NREPA - Environmental Remediation	82002750	42.427745	-83.035253
Det Multi-Site (18141 Schoenherr)	Part 201, NREPA - Environmental Remediation	82003193	42.429348	-82.9851024
4900 East Hildale Street	Part 201, NREPA - Environmental Remediation	82007951	42.4296	-83.0542
7521 Hildale	Part 201, NREPA - Environmental Remediation	82003033	42.430598	-83.02676
18656 Mount Elliot	Part 201, NREPA - Environmental Remediation	82003067	42.43104	-83.038415
U S Industries	Part 201, NREPA - Environmental Remediation	82000164	42.431595	-83.034792
18920 Antwerp	Part 201, NREPA - Environmental Remediation	82002999	42.432885	-83.018026
5050 E. Seven Mile	Part 201, NREPA - Environmental Remediation	82003125	42.433118	-83.0523289
18942 Antwerp	Part 201, NREPA - Environmental Remediation	82003105	42.433198	-83.017477
Troy Auto Parts	Part 201, NREPA - Environmental Remediation	82000052	42.433369	-83.017821
Crystal Filtration	Part 201, NREPA - Environmental Remediation	82001783	42.433864	-83.017459
14919 E. Seven Mile Rd	Part 201, NREPA - Environmental Remediation	82007273	42.4354	-82.9685
Seven Mile and Gratiot Development	Part 201, NREPA - Environmental Remediation	82001884	42.435466	-82.977774
Global Titanium - 19221 Filer Street	Part 201, NREPA - Environmental Remediation	82002571	42.435484	-83.038053
16090 E. Seven Mile road	Part 201, NREPA - Environmental Remediation	82006855	42.435488	-82.9541384
Southland Corp E Seven Mile	Part 201, NREPA - Environmental Remediation	82001489	42.435841	-82.975157
19300, 19365 Sherwood	Part 201, NREPA - Environmental Remediation	82002739	42.436598	-83.03403
14383 - 14455 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	82007241	42.436691	-82.9788155
Global Titanium - 19420 Mt. Elliot	Part 201, NREPA - Environmental Remediation	82001785	42.437524	-83.0385551
Industrial Smelting (former)	Part 201, NREPA - Environmental Remediation	82002583	42.437831	-83.037676
Former Voss Steel Property	Part 201, NREPA - Environmental Remediation	82002664	42.43801	-83.03529
19460 Mount Elliott Street	Part 201, NREPA - Environmental Remediation	82006969	42.438497	-83.0383449
Former K-Mart Auto Service Garage	Part 201, NREPA - Environmental Remediation	82002888	42.439708	-83.0353465
19717 & 19737 Mound - Part 213	Part 201, NREPA - Environmental Remediation	82003058	42.439927	-83.044366
20481 Mack Avenue	Part 201, NREPA - Environmental Remediation	82008498	42.440274	-82.9079904
Grand Truck / Detroit Nolan Yard	Part 201, NREPA - Environmental Remediation	82002802	42.440648	-83.0132509
3775 East Outer Drive	Part 201, NREPA - Environmental Remediation	82007828	42.441	-83.0384
3855 East Outer Drive	Part 201, NREPA - Environmental Remediation	82007838	42.441	-83.0369
19930 Conner Avenue	Part 201, NREPA - Environmental Remediation	82007438	42.4411	-83.0181
19725 Strasburg	Part 201, NREPA - Environmental Remediation	82003054	42.441295	-82.999251
Beland and E. State Fair	Part 201, NREPA - Environmental Remediation	82003062	42.441492	-83.008997
14901 Gratiot Ave	Part 201, NREPA - Environmental Remediation	82006839	42.442769	-82.9730096
1850 Vernier Road	Part 201, NREPA - Environmental Remediation	82002376	42.443534	-82.905871
Whittar Steel	Part 201, NREPA - Environmental Remediation	82001416	42.44387	-83.036572
Detroit Center Tool (DCT)	Part 201, NREPA - Environmental Remediation	82001766	42.444387	-83.005257
Chrysler-Former Powertrain Facility	Part 201, NREPA - Environmental Remediation	82002705	42.444395	-83.041446
Fife-Pearce Electric Company	Part 201, NREPA - Environmental Remediation	82002963	42.445146	-83.0350695
former Tower Defense and Aerospace	Part 201, NREPA - Environmental Remediation	82002789	42.445345	-83.006789
Detroit Light Guard Armory	Part 201, NREPA - Environmental Remediation	82000435	42.446463	-83.06033
3500 E. Eight Mile	Part 201, NREPA - Environmental Remediation	82003103	42.446916	-83.069779
Inland Tool and Manuf Former	Part 201, NREPA - Environmental Remediation	82001413	42.447374	-83.005384
20530 Hoover	Part 201, NREPA - Environmental Remediation	82002994	42.447536	-83.0043838
6400 East Eight Mile Road	Part 201, NREPA - Environmental Remediation	82008072	42.4479	-83.038
Sunshine Aluminum Property	Part 201, NREPA - Environmental Remediation	50000778	42.447936	-83.053111
23902 Sherwood	Part 201, NREPA - Environmental Remediation	50000917	42.447956	-83.034502
19340 Vernier Road	Part 201, NREPA - Environmental Remediation	82002299	42.447983	-82.93094
20550 Hoover Street	Part 201, NREPA - Environmental Remediation	82008390	42.448082	-83.0045198
11360 E. Eight Mile - Part 213	Part 201, NREPA - Environmental Remediation	82003092	42.448417	-83.008953
18000 Vernier Road	Part 201, NREPA - Environmental Remediation	82006952	42.44842	-82.9327578
8077 E. 8 Mile	Part 201, NREPA - Environmental Remediation	50000970	42.448498	-83.023837
Aradden Hall	Part 201, NREPA - Environmental Remediation	50000805	42.448894	-83.018301
Mahon Door Corp	Part 201, NREPA - Environmental Remediation	50000049	42.449576	-82.990625
16000 East 8 Mile Road	Part 201, NREPA - Environmental Remediation	82007313	42.449727	-82.9557191
Chrysler Motors	Part 201, NREPA - Environmental Remediation	50000828	42.449906	-83.035882
Grinders Clearing House	Part 201, NREPA - Environmental Remediation	50000848	42.449918	-82.988917
11503 E. 8 Mile	Part 201, NREPA - Environmental Remediation	50001039	42.450162	-83.006684
14925 E. 8 Mile Road	Part 201, NREPA - Environmental Remediation	50001093	42.450303	-82.968055
14907 8 Mile Road	Part 201, NREPA - Environmental Remediation	50500083	42.450647	-82.9664673
16145 East Eight Mile Road	Part 201, NREPA - Environmental Remediation	82007320	42.4507	-82.9548
21300 Groesbeck	Part 201, NREPA - Environmental Remediation	50001082	42.452897	-82.999153
Anthony's Florist	Part 201, NREPA - Environmental Remediation	50000628	42.45302	-83.025464
21000 Hoover Road	Part 201, NREPA - Environmental Remediation	50000982	42.453278	-83.0031555
21547 Helle	Part 201, NREPA - Environmental Remediation	50500164	42.4541	-82.9991
Ethone-Omi (Former)	Part 201, NREPA - Environmental Remediation	50000942	42.454286	-83.0085078
Alternative Techologies	Part 201, NREPA - Environmental Remediation	50001268	42.454602	-83.0117791
21520 Mullin Avenue	Part 201, NREPA - Environmental Remediation	50500479	42.454811	-83.0109065
Gibbs Machinery Co	Part 201, NREPA - Environmental Remediation	50000233	42.454997	-83.0040796
CARBOLOY, INC.	Part 201, NREPA - Environmental Remediation	50000642	42.455007	-83.011619
Gibbs Machinery Co	Part 201, NREPA - Environmental Remediation	50000685	42.455022	-83.0040393
Gibbs Machinery Co	Part 201, NREPA - Environmental Remediation	50000684	42.455036	-83.0040171
CCT Delicouper Industries	Part 201, NREPA - Environmental Remediation	50000821	42.455084	-83.004302
21555-21601 Mullin	Part 201, NREPA - Environmental Remediation	50001048	42.455096	-83.013248
Gibbs Machinery Co	Part 201, NREPA - Environmental Remediation	50001071	42.455175	-83.0040329
Parklane & Jefferson Res	Part 201, NREPA - Environmental Remediation	50000697	42.455249	-82.883934
Linde Gas Property (Former)	Part 201, NREPA - Environmental Remediation	50000860	42.456786	-82.996469
Machinery Plaza	Part 201, NREPA - Environmental Remediation	50000863	42.456802	-83.004523
Kanter Elementary School - Eastpointe	Part 201, NREPA - Environmental Remediation	50000833	42.45721	-82.941995
Avalon 20100	Part 201, NREPA - Environmental Remediation	50000809	42.458776	-82.918018
22550 Nagel Street	Part 201, NREPA - Environmental Remediation	50500462	42.458883	-83.0012161
22301 Harper Avenue	Part 201, NREPA - Environmental Remediation	50500170	42.46	-82.9106
22522 Hoover Road	Part 201, NREPA - Environmental Remediation	50001120	42.460516	-83.0041052
Performance Automotive	Part 201, NREPA - Environmental Remediation	50000631	42.460753	-82.986042
22705 Hoover	Part 201, NREPA - Environmental Remediation	50001077	42.46093	-83.005832
Hofley Manufacturing	Part 201, NREPA - Environmental Remediation	50000849	42.461369	-82.992596
AEI Systems	Part 201, NREPA - Environmental Remediation	50000792	42.46271	-82.921496
22950 Van Dyke Avenue	Part 201, NREPA - Environmental Remediation	50500446	42.462718	-83.0260218
8024 East 9 Mile Road	Part 201, NREPA - Environmental Remediation	50001068	42.46273	-83.026034
International Village	Part 201, NREPA - Environmental Remediation	50001201	42.462905	-83.025503
Advanced Motors	Part 201, NREPA - Environmental Remediation	50000798	42.462922	-83.025755
22407 Kelly Road	Part 201, NREPA - Environmental Remediation	50500172	42.463	-82.9291
Golden Link Temple	Part 201, NREPA - Environmental Remediation	50001200	42.46311	-83.026174
22877 Hillock Avenue	Part 201, NREPA - Environmental Remediation	50001122	42.463162	-82.991173
15913 Ethetyn Road	Part 201, NREPA - Environmental Remediation	50001057	42.463806	-82.958008
22600 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	50500448	42.464101	-82.9574344
11955 and 12345 East 9 Mile, 23270 Hoove	Part 201, NREPA - Environmental Remediation	50500456	42.464126	-83.0028306
14447 East Nine Mile Road	Part 201, NREPA - Environmental Remediation	50500129	42.4644	-82.973
First National Bank - 16420 W. 9 Mile	Part 201, NREPA - Environmental Remediation	50000838	42.464519	-82.951735
Stachura Spencer LLC Vacant Property	Part 201, NREPA - Environmental Remediation	50001226	42.464836	-82.975482
CVS - SW Corner E 9 Mile & Kelly	Part 201, NREPA - Environmental Remediation	50001234	42.465152	-82.928301
Bank of America - Eastpointe M18-058 (50	Part 201, NREPA - Environmental Remediation	50500079	42.4653	-82.9228054
12755 East Nine Mile Road	Part 201, NREPA - Environmental Remediation	50001118	42.465898	-82.994711
Shores Oil Company	Part 201, NREPA - Environmental Remediation	50000031	42.46593	-82.919587
22903 East Industrial Drive	Part 201, NREPA - Environmental Remediation	50500181	42.466	-82.9161
19669 East 9 Mile Road	Part 201, NREPA - Environmental Remediation	50500095	42.466045	-82.9175549
19673 & 19675 East 9 Mile Road	Part 201, NREPA - Environmental Remediation	50500072	42.466102	-82.9182984
22901 and 22925 Industrial Drive West	Part 201, NREPA - Environmental Remediation	50001128	42.466136	-82.919215
Nine Mile Road Vacant Property	Part 201, NREPA - Environmental Remediation	50000710	42.46638	-82.89405
Industrial Drive Property - 22931 W. Ind	Part 201, NREPA - Environmental Remediation	50001212	42.466979	-82.918518

Site Name	Type	ID	Latitude	Longitude
All Truck Body Repair	Part 201, NREPA - Environmental Remediation	50000803	42.467192	-83.033972
23325 Harper (fmr 23301-23407) Former Ga	Part 201, NREPA - Environmental Remediation	50500092	42.467464	-82.9078868
Industrial Drive Property - 22955 W. Ind	Part 201, NREPA - Environmental Remediation	50001216	42.467598	-82.918464
Production Plating	Part 201, NREPA - Environmental Remediation	50000874	42.467663	-82.955378
X-Ray Industries/PPI Services, LLC	Part 201, NREPA - Environmental Remediation	50001235	42.467852	-82.987689
Parton and Preble	Part 201, NREPA - Environmental Remediation	50000871	42.468007	-82.987771
23000 Industrial Dr.	Part 201, NREPA - Environmental Remediation	50001019	42.468261	-82.91638
23513 & 23605 Groesbeck Highway	Part 201, NREPA - Environmental Remediation	50500087	42.468869	-82.9879707
23050 Industrial Dr.	Part 201, NREPA - Environmental Remediation	50000915	42.46887	-82.91602
23751 and 23801 Hoover Road	Part 201, NREPA - Environmental Remediation	50500078	42.469551	-83.0059633
Ceratizit	Part 201, NREPA - Environmental Remediation	50001162	42.469889	-83.010088
11450 Stephens	Part 201, NREPA - Environmental Remediation	50000905	42.46994	-83.008702
23709 - 23801 Harper Avenue	Part 201, NREPA - Environmental Remediation	82007535	42.470042	-82.9064205
23750 Regency Park Dr.	Part 201, NREPA - Environmental Remediation	50001054	42.470156	-82.992053
23884 Hoover	Part 201, NREPA - Environmental Remediation	50000933	42.470386	-83.005094
Weldaloy Products Company	Part 201, NREPA - Environmental Remediation	50000767	42.47052	-83.007061
11530 Stephens Road	Part 201, NREPA - Environmental Remediation	50500102	42.4706	-83.0074
Former Chassix	Part 201, NREPA - Environmental Remediation	50500096	42.47098	-82.9904221
13001 Stephens	Part 201, NREPA - Environmental Remediation	50000974	42.471537	-82.992635
11501 Stephens	Part 201, NREPA - Environmental Remediation	50001028	42.47162	-83.007945
Capri Tube	Part 201, NREPA - Environmental Remediation	50000824	42.471674	-83.002344
Color Custom	Part 201, NREPA - Environmental Remediation	50000831	42.471948	-83.005179
24144 Groesbeck	Part 201, NREPA - Environmental Remediation	50000957	42.472012	-82.985522
Robbins CPR,INC	Part 201, NREPA - Environmental Remediation	50000624	42.472031	-83.004919
24155 Schoenherr	Part 201, NREPA - Environmental Remediation	50001003	42.472816	-82.986989
24301 Hoover	Part 201, NREPA - Environmental Remediation	50000943	42.473207	-83.006899
11434 Kaltz	Part 201, NREPA - Environmental Remediation	50000924	42.473312	-83.008425
24235 Harper	Part 201, NREPA - Environmental Remediation	50500204	42.4734	-82.9047
A-1 Parts Washing	Part 201, NREPA - Environmental Remediation	50000967	42.473622	-82.988703
Almo Manifold and Tool	Part 201, NREPA - Environmental Remediation	50000804	42.473936	-83.009148
24358 Groesbeck Highway	Part 201, NREPA - Environmental Remediation	50500097	42.473939	-82.982718
A & R Freight	Part 201, NREPA - Environmental Remediation	50000796	42.474028	-83.0089
24800 Jefferson	Part 201, NREPA - Environmental Remediation	50001018	42.474514	-82.886194
24501 Hoover	Part 201, NREPA - Environmental Remediation	50001090	42.474552	-83.006611
Former Coal Field Industrial Property	Part 201, NREPA - Environmental Remediation	50001242	42.474612	-82.989011
24600 Industrial Highway	Part 201, NREPA - Environmental Remediation	50500209	42.476152	-82.9886786
14116 - 14140 East 10 Mile Road	Part 201, NREPA - Environmental Remediation	50500469	42.476823	-82.9798044
14116 - 14140 East 10 Mile Road	Part 201, NREPA - Environmental Remediation	50500459	42.476848	-82.979759
Jefferson Avenue Commercial Property	Part 201, NREPA - Environmental Remediation	50500071	42.477333	-82.8897498
Ten Mile Drain	Part 201, NREPA - Environmental Remediation	50000736	42.47756	-82.88928
16834 Chesterfield Avenue	Part 201, NREPA - Environmental Remediation	50001132	42.477692	-82.948023
12801 E. 10 Mile	Part 201, NREPA - Environmental Remediation	50000931	42.478147	-82.992429
11631 10 Mile	Part 201, NREPA - Environmental Remediation	50000929	42.478313	-83.005523
14141 and 14155 Ten Mile Road	Part 201, NREPA - Environmental Remediation	50500125	42.4788	-82.98
25040 easy Street	Part 201, NREPA - Environmental Remediation	50500214	42.4795	-82.9759
25133 Flanders	Part 201, NREPA - Environmental Remediation	50500217	42.4795	-82.9805
17140 East 10 Mile Road	Part 201, NREPA - Environmental Remediation	50500148	42.4797	-82.9439
Speedy Muffler - Gratiot	Part 201, NREPA - Environmental Remediation	50000883	42.479915	-82.948617
25125 Easy Street	Part 201, NREPA - Environmental Remediation	50500216	42.4802	-82.9761
25007-25013 Little Mack	Part 201, NREPA - Environmental Remediation	50000986	42.48021	-82.907
18015 East 10 Mile Road	Part 201, NREPA - Environmental Remediation	50500152	42.480732	-82.9357543
25216 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	50500467	42.481011	-82.9465999
25760 Groesbeck	Part 201, NREPA - Environmental Remediation	50001089	42.482662	-82.97507
XL Color	Part 201, NREPA - Environmental Remediation	50000765	42.483286	-82.90788
25753 Groesbeck	Part 201, NREPA - Environmental Remediation	50000993	42.483305	-82.977128
Iroquois Ind. (Former Veet Industries)	Part 201, NREPA - Environmental Remediation	50000090	42.483593	-82.978659
STA Brite Plating	Part 201, NREPA - Environmental Remediation	50000889	42.483679	-82.976041
26210 Harper Avenue, St. Clair Shores	Part 201, NREPA - Environmental Remediation	50001127	42.4852	-82.90303
Nutrax/Ashley Capital	Part 201, NREPA - Environmental Remediation	50000085	42.486958	-82.971146
M-97 Auto	Part 201, NREPA - Environmental Remediation	50001232	42.489839	-82.972238
Lipari Freezer Warehouse Property	Part 201, NREPA - Environmental Remediation	50001258	42.491643	-82.975417
DETROIT CELLULAR TELEPHONE	Part 201, NREPA - Environmental Remediation	50000640	42.491951	-82.981297
15085 East Eleven Mile Rd.	Part 201, NREPA - Environmental Remediation	50500131	42.4944	-82.9675
Home Quarters Inc.	Part 201, NREPA - Environmental Remediation	50000851	42.49507	-82.932919
27090 Gratiot	Part 201, NREPA - Environmental Remediation	50000937	42.495533	-82.936741
Eric's Coin Laundry (former)	Part 201, NREPA - Environmental Remediation	50001192	42.495615	-82.937089
St. Clair Shores Library	Part 201, NREPA - Environmental Remediation	50001220	42.495835	-82.887785
27101 Groesbeck	Part 201, NREPA - Environmental Remediation	50000990	42.495839	-82.969115
27138 - 27144 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	50500442	42.496096	-82.9369249
Shell Service Station (00010472)	Part 201, NREPA - Environmental Remediation	50500073	42.496404	-82.8978787
27250 Gloede	Part 201, NREPA - Environmental Remediation	50001084	42.496597	-82.971051
27330 Gloede	Part 201, NREPA - Environmental Remediation	50001002	42.497452	-82.970726
27500 and 27544 Groesbeck Highway	Part 201, NREPA - Environmental Remediation	50500233	42.4983	-82.9658
Advantage Packaging	Part 201, NREPA - Environmental Remediation	50000788	42.498653	-82.966843
27470 Gloede Street	Part 201, NREPA - Environmental Remediation	50000920	42.498754	-82.97133
Beyer Property	Part 201, NREPA - Environmental Remediation	50000817	42.499048	-82.883575
AM Specialties	Part 201, NREPA - Environmental Remediation	50000793	42.4999	-82.963616
Caratron Industries	Part 201, NREPA - Environmental Remediation	50000825	42.500902	-82.9699103
27947 Groesbeck	Part 201, NREPA - Environmental Remediation	50001087	42.500929	-82.965232
D & P Auto Service	Part 201, NREPA - Environmental Remediation	50001266	42.502383	-82.9334521
28000-28102 Groesbeck	Part 201, NREPA - Environmental Remediation	50001047	42.502404	-82.962773
28333 Utica Road	Part 201, NREPA - Environmental Remediation	50001125	42.50442	-82.93327
Roseville Residential Heating Oil Releas	Part 201, NREPA - Environmental Remediation	50001244	42.505337	-82.921213
Gratiot and Florence	Part 201, NREPA - Environmental Remediation	50001044	42.507447	-82.929646
Former Sunoco Jefferson Station	Part 201, NREPA - Environmental Remediation	50500093	42.507914	-82.8813081
29200 Harper Avenue	Part 201, NREPA - Environmental Remediation	50001015	42.508653	-82.8974938
29000 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	50001129	42.510263	-82.926913
Taylor School	Part 201, NREPA - Environmental Remediation	50000893	42.517892	-82.901692
Macomb County DPW Violet Pump Station	Part 201, NREPA - Environmental Remediation	50000578	42.521135	-82.889054
30751 Little Mack	Part 201, NREPA - Environmental Remediation	50000919	42.521757	-82.90965
20550 13 Mile Road SW corner of 13 Mile	Part 201, NREPA - Environmental Remediation	50500159	42.5248	-82.9114
Lake Shore Public Schools - Masonic Blvd	Part 201, NREPA - Environmental Remediation	50000856	42.529908	-82.877981
32300 Harper Avenue (FAC ID #00010473)	Part 201, NREPA - Environmental Remediation	50500089	42.532863	-82.8876445
33200 Freeway Drive	Part 201, NREPA - Environmental Remediation	50001080	42.538519	-82.887249
Fuel Oil Spill (14 Mile and I-94)	Part 201, NREPA - Environmental Remediation	50000621	42.540276	-82.886401
SMK Speedy Muffler	Part 201, NREPA - Environmental Remediation	50000879	42.540717	-82.907434
21340 Pitko	Part 201, NREPA - Environmental Remediation	50000951	42.544042	-82.901177
Talon Development	Part 201, NREPA - Environmental Remediation	50000892	42.544472	-82.905017
33670 Lipke Drive	Part 201, NREPA - Environmental Remediation	50500284	42.5451	-82.8898
Grosse Pointe Clinton Refuse Disposal	Part 201, NREPA - Environmental Remediation	50001243	42.545407	-82.889876
Quinn Road and Gratiot Development	Part 201, NREPA - Environmental Remediation	50001219	42.545664	-82.902991
Pitko Landfill Former	Part 201, NREPA - Environmental Remediation	50000093	42.54655	-82.903133
Quinn Rd Grosse Pointe Dump	Part 201, NREPA - Environmental Remediation	50001248	42.54797	-82.895703
34401 Gratiot Avenue	Part 201, NREPA - Environmental Remediation	50001106	42.548524	-82.903605
2.48 Parcel at Canton and Catalano	Part 201, NREPA - Environmental Remediation	50001109	42.550763	-82.9053
Unitech of South Michigan	Part 201, NREPA - Environmental Remediation	50000894	42.552482	-82.883021
20717 Fifteen Mile Road	Part 201, NREPA - Environmental Remediation	50001114	42.554857	-82.909747
New Matic Industries	Part 201, NREPA - Environmental Remediation	50000622	42.555055	-82.867816

Site Name	Type	ID	Latitude	Longitude
Gratiot & 15 Mile Redev-Montgomery Ward	Part 201, NREPA - Environmental Remediation	50000781	42.556745	-82.898841
Church of Christ Care Center	Part 201, NREPA - Environmental Remediation	50001228	42.557616	-82.874533
Jefferson Motor Service	Part 201, NREPA - Environmental Remediation	50001267	42.571268	-82.8349679
St. Joseph Living Care	Part 201, NREPA - Environmental Remediation	50000882	42.573888	-82.870813
Huron-Clinton Metropolitan Authority	Part 201, NREPA - Environmental Remediation	50001239	42.587677	-82.807121
Aggressive Marine	Part 201, NREPA - Environmental Remediation	50000802	42.593178	-82.786716
Jefferson Assembly Plant	Part 211, NREPA - Underground Storage Tanks (Active)	16152	42.369298	-82.962073
Detroit Economic Development	Part 211, NREPA - Underground Storage Tanks (Active)	50001262	42.369404	-82.962405
East Jefferson Moving Center	Part 211, NREPA - Underground Storage Tanks (Active)	15337	42.369407	-82.963701
Golightly Voc/tech Center	Part 211, NREPA - Underground Storage Tanks (Active)	5457	42.369736	-82.952138
Jefferson/conners Project	Part 211, NREPA - Underground Storage Tanks (Active)	50001551	42.369818	-82.959022
A & J Fuel LLC	Part 211, NREPA - Underground Storage Tanks (Active)	10482	42.369886	-82.959529
North Chrysler Plant	Part 211, NREPA - Underground Storage Tanks (Active)	50001552	42.370763	-82.969675
Comerica Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37271	42.370858	-82.949637
Vacant Property	Part 211, NREPA - Underground Storage Tanks (Active)	38574	42.371557	-82.948547
Fire Dept Engine #38	Part 211, NREPA - Underground Storage Tanks (Active)	19111	42.371625	-82.950189
Sunoco 008-3287	Part 211, NREPA - Underground Storage Tanks (Active)	5950	42.37263	-82.945802
King Scrap Iron & Metal Co	Part 211, NREPA - Underground Storage Tanks (Active)	18204	42.373397	-82.96852
Standard Car Wash Inc	Part 211, NREPA - Underground Storage Tanks (Active)	17990	42.374022	-82.942246
Vito Tigaudo	Part 211, NREPA - Underground Storage Tanks (Active)	36577	42.374314	-82.941519
Mobile	Part 211, NREPA - Underground Storage Tanks (Active)	38758	42.374531	-82.940163
Jefferson Express Marathon	Part 211, NREPA - Underground Storage Tanks (Active)	10494	42.374815	-82.939449
Eastside Transition Center	Part 211, NREPA - Underground Storage Tanks (Active)	38971	42.374836	-82.947175
New Chrysler Plant	Part 211, NREPA - Underground Storage Tanks (Active)	50000236	42.37555517	-82.97228095
Nrt Owner	Part 211, NREPA - Underground Storage Tanks (Active)	50005157	42.375563	-82.938379
Conner-vernor Center	Part 211, NREPA - Underground Storage Tanks (Active)	10912	42.375818	-82.963296
City of Grosse Pointe Park	Part 211, NREPA - Underground Storage Tanks (Active)	143	42.375941	-82.937669
Hammond Chevrolet Inc	Part 211, NREPA - Underground Storage Tanks (Active)	8396	42.376223	-82.937015
Jefferson Chevrolet	Part 211, NREPA - Underground Storage Tanks (Active)	34912	42.376223	-82.937015
Don Cartage Co	Part 211, NREPA - Underground Storage Tanks (Active)	15323	42.376226	-82.97165
Lake Pointe	Part 211, NREPA - Underground Storage Tanks (Active)	35492	42.376469	-82.936432
Jess's Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	5965	42.376682	-82.934728
City	Part 211, NREPA - Underground Storage Tanks (Active)	142	42.377001	-82.934104
Crown Enterprises Inc	Part 211, NREPA - Underground Storage Tanks (Active)	14092	42.377071	-82.967483
Detroit Economic Development Cor	Part 211, NREPA - Underground Storage Tanks (Active)	50000378	42.378812	-82.973733
Lake Oil Inc	Part 211, NREPA - Underground Storage Tanks (Active)	14102	42.378868	-82.94795
Amoco Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	21363	42.379497	-82.946303
Abandoned Property	Part 211, NREPA - Underground Storage Tanks (Active)	50002298	42.380396	-83.001142
Hart Rock Manufacturing	Part 211, NREPA - Underground Storage Tanks (Active)	35122	42.38043	-82.974367
Mack Avenue Engine Plant	Part 211, NREPA - Underground Storage Tanks (Active)	3859	42.380632	-82.976951
Mack Avenue Engine Plant #1	Part 211, NREPA - Underground Storage Tanks (Active)	39368	42.380864	-82.979616
Former Gasoline Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005662	42.38146068	-82.93954662
Abandoned Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50000895	42.381729	-82.939333
Helen Dekorse	Part 211, NREPA - Underground Storage Tanks (Active)	36446	42.381917	-82.928096
J C Cornillie Co	Part 211, NREPA - Underground Storage Tanks (Active)	11356	42.381955	-82.974632
W & H Gas & More	Part 211, NREPA - Underground Storage Tanks (Active)	3332	42.382074	-82.997701
Universal Petro	Part 211, NREPA - Underground Storage Tanks (Active)	5678	42.382213	-82.996558
Brake Shop	Part 211, NREPA - Underground Storage Tanks (Active)	38846	42.382258	-82.938711
Lloyds Garage	Part 211, NREPA - Underground Storage Tanks (Active)	50000020	42.382384	-82.996131
Pierce Middle School	Part 211, NREPA - Underground Storage Tanks (Active)	40937	42.382458	-82.937301
Conner Fuel Mart	Part 211, NREPA - Underground Storage Tanks (Active)	41794	42.3829802	-82.96762716
Mack Road Transfer Station	Part 211, NREPA - Underground Storage Tanks (Active)	20177	42.383023	-82.973397
General Wine Holdings	Part 211, NREPA - Underground Storage Tanks (Active)	16218	42.383072	-82.973263
Underdevelop Property	Part 211, NREPA - Underground Storage Tanks (Active)	41519	42.38361296	-82.96729903
Meadows Products Of Michigan	Part 211, NREPA - Underground Storage Tanks (Active)	34587	42.383618	-82.971738
Former Gas Station (10000083)	Part 211, NREPA - Underground Storage Tanks (Active)	50006021	42.383657	-82.9477642
FCA US LLC - Mack Avenue Engine Plant II	Part 211, NREPA - Underground Storage Tanks (Active)	40037	42.383887	-82.981609
Beaumont Grosse Pointe	Part 211, NREPA - Underground Storage Tanks (Active)	20089	42.38427758	-82.91345366
059012530 Mack Av Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	12382	42.384297	-82.968135
Amoco Oil Station #0107	Part 211, NREPA - Underground Storage Tanks (Active)	21323	42.384531	-82.962115
Mack Fuel	Part 211, NREPA - Underground Storage Tanks (Active)	36302	42.384562	-82.968225
Altimate Auto Service	Part 211, NREPA - Underground Storage Tanks (Active)	2521	42.384878	-82.990529
Former Joy Property	Part 211, NREPA - Underground Storage Tanks (Active)	42641	42.38501059	-82.9873681
Former Whittier Cleaners	Part 211, NREPA - Underground Storage Tanks (Active)	425	42.38504469	-82.94440099
Embree Sign Co	Part 211, NREPA - Underground Storage Tanks (Active)	34420	42.385376	-82.943753
Bernice People	Part 211, NREPA - Underground Storage Tanks (Active)	4245	42.385618	-83.010541
Allen Hill	Part 211, NREPA - Underground Storage Tanks (Active)	37705	42.385715	-82.988329
Special Touch Colision	Part 211, NREPA - Underground Storage Tanks (Active)	50002558	42.385863	-82.987943
Benz Fairview Service	Part 211, NREPA - Underground Storage Tanks (Active)	18946	42.385892	-82.987043
City Of Grosse Pointe	Part 211, NREPA - Underground Storage Tanks (Active)	39489	42.38633	-82.911777
L Marrua	Part 211, NREPA - Underground Storage Tanks (Active)	21681	42.386663	-82.951461
Mack Valero Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10484	42.386689	-82.952897
Shorebank Development Co	Part 211, NREPA - Underground Storage Tanks (Active)	39487	42.386919	-82.95161
Handlons Truck & Auto Service In	Part 211, NREPA - Underground Storage Tanks (Active)	19802	42.387285	-82.970867
Mary Orhan	Part 211, NREPA - Underground Storage Tanks (Active)	33706	42.387316	-82.947641
Prices Used Cars	Part 211, NREPA - Underground Storage Tanks (Active)	33505	42.387339	-82.983882
Mack & Alter Site	Part 211, NREPA - Underground Storage Tanks (Active)	41372	42.38742116	-82.94762903
Mack & Alter Marathon	Part 211, NREPA - Underground Storage Tanks (Active)	41319	42.387659	-82.948683
Superamerica Property No. 391	Part 211, NREPA - Underground Storage Tanks (Active)	50001750	42.387721	-82.971419
Sw Corner Of Mack & Beaconsfield	Part 211, NREPA - Underground Storage Tanks (Active)	39087	42.388007	-82.943833
U-haul Co of Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	5091	42.38854	-83.008176
8200 Harper Avenue	Part 211, NREPA - Underground Storage Tanks (Active)	42693	42.38871388	-83.01900394
Firestone Store #2535/015318	Part 211, NREPA - Underground Storage Tanks (Active)	7815	42.388957	-82.97935
R C Krausmann	Part 211, NREPA - Underground Storage Tanks (Active)	8881	42.38906264	-82.91837283
Village Marathon	Part 211, NREPA - Underground Storage Tanks (Active)	9345	42.389086	-82.919788
DDOT Shoemaker Garage	Part 211, NREPA - Underground Storage Tanks (Active)	13466	42.389122	-82.985537
Car Wash	Part 211, NREPA - Underground Storage Tanks (Active)	39281	42.389224	-82.939034
C W Mungo Contracting Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37990	42.389238	-82.994798
Hussein H Gazoun	Part 211, NREPA - Underground Storage Tanks (Active)	34697	42.389285	-83.007685
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005233	42.38931503	-82.98934222
Amoco Oil Station #5094	Part 211, NREPA - Underground Storage Tanks (Active)	21299	42.389462	-83.02269
City of Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	41622	42.38947157	-82.9885468
Former Fisher & Maumee Automotiv	Part 211, NREPA - Underground Storage Tanks (Active)	3413	42.38951	-82.903487
Carco Inc	Part 211, NREPA - Underground Storage Tanks (Active)	14103	42.389528	-82.99833
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005341	42.38956542	-82.99573015
Metro Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	50002631	42.38960524	-82.99371527
Mack Management LLC	Part 211, NREPA - Underground Storage Tanks (Active)	5794	42.389826	-82.936467
Samaritan Center Inc	Part 211, NREPA - Underground Storage Tanks (Active)	35730	42.389905	-82.982708
Farm Fresh	Part 211, NREPA - Underground Storage Tanks (Active)	41897	42.39	-82.903889
Maire Elementary School	Part 211, NREPA - Underground Storage Tanks (Active)	40939	42.390603	-82.919464
Harper-Fischer Shell Service Inc	Part 211, NREPA - Underground Storage Tanks (Active)	16140	42.390668	-83.014213
Gays Fine Cleaners	Part 211, NREPA - Underground Storage Tanks (Active)	4785	42.390929	-82.933408
Amin Shariff	Part 211, NREPA - Underground Storage Tanks (Active)	2295	42.390946	-82.970981
French Mini Mart Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	10491	42.391223	-82.994984
Mr Thomas Sullivan	Part 211, NREPA - Underground Storage Tanks (Active)	40042	42.391233	-82.932593
Bw&t Real Estate Dev. Assoc.	Part 211, NREPA - Underground Storage Tanks (Active)	19323	42.391276	-82.985285
Bridges Sales & Service	Part 211, NREPA - Underground Storage Tanks (Active)	6170	42.391476	-82.931952
Genes Landscape Service Co	Part 211, NREPA - Underground Storage Tanks (Active)	36972	42.391637	-82.946077

Site Name	Type	ID	Latitude	Longitude
Pvh Veterinary Hospitals	Part 211, NREPA - Underground Storage Tanks (Active)	37774	42.391702	-82.931355
Marathon Unit #2748	Part 211, NREPA - Underground Storage Tanks (Active)	34047	42.392357	-83.005635
Hern Yard	Part 211, NREPA - Underground Storage Tanks (Active)	8526	42.392749	-82.992248
Stockman Service	Part 211, NREPA - Underground Storage Tanks (Active)	333	42.39279	-82.965915
Gratiot Fuels LLC	Part 211, NREPA - Underground Storage Tanks (Active)	41092	42.392925	-83.005835
Eastside Oil Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	13119	42.39298	-82.992446
Waste Acid Services Inc	Part 211, NREPA - Underground Storage Tanks (Active)	1053	42.393398	-83.03383
Hurricane Industries LLC	Part 211, NREPA - Underground Storage Tanks (Active)	34880	42.393438	-82.987933
City of Detroit - Planning and Development	Part 211, NREPA - Underground Storage Tanks (Active)	41414	42.3935933	-83.00145094
Chandler Park Service Yard	Part 211, NREPA - Underground Storage Tanks (Active)	19064	42.393656	-82.984249
Ashland Chemical Inc	Part 211, NREPA - Underground Storage Tanks (Active)	16031	42.393678	-83.033699
Former West Side Construction	Part 211, NREPA - Underground Storage Tanks (Active)	40960	42.393739	-83.033483
Grosse Pointe Central Lib.	Part 211, NREPA - Underground Storage Tanks (Active)	40934	42.393865	-82.905719
Bob Maxey Lincoln Mercury	Part 211, NREPA - Underground Storage Tanks (Active)	10711	42.39427	-82.924741
Tjo Reality LLC	Part 211, NREPA - Underground Storage Tanks (Active)	5714	42.394314	-82.904475
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005639	42.394642	-83.004594
Wccc Eastern Campus	Part 211, NREPA - Underground Storage Tanks (Active)	7548	42.394778	-82.986829
Detroit Niagara CO (M17106)	Part 211, NREPA - Underground Storage Tanks (Active)	11692	42.394848	-82.923208
10070 Gratiot Property LLC	Part 211, NREPA - Underground Storage Tanks (Active)	33684	42.39486	-83.003979
Cross & Peters Co	Part 211, NREPA - Underground Storage Tanks (Active)	1367	42.394871	-82.997942
Warren & Lakewood Service	Part 211, NREPA - Underground Storage Tanks (Active)	33239	42.394903	-82.960959
East Corp	Part 211, NREPA - Underground Storage Tanks (Active)	38159	42.39493	-82.92225
VIP's Hand Car Wash	Part 211, NREPA - Underground Storage Tanks (Active)	41696	42.39498274	-82.95988596
Haron Metals & Equipment Co	Part 211, NREPA - Underground Storage Tanks (Active)	36238	42.395005	-83.035479
Accurate Tumbling Co	Part 211, NREPA - Underground Storage Tanks (Active)	12610	42.39506	-83.037631
Con	Part 211, NREPA - Underground Storage Tanks (Active)	50001588	42.395186	-82.921925
PVS Technologies Inc	Part 211, NREPA - Underground Storage Tanks (Active)	33676	42.395215	-82.996316
Pvs Chemicals Inc	Part 211, NREPA - Underground Storage Tanks (Active)	6711	42.395249	-82.995349
Bluehill Sewage Pumping Station	Part 211, NREPA - Underground Storage Tanks (Active)	17210	42.395381	-82.922207
Ken Meade Leasing	Part 211, NREPA - Underground Storage Tanks (Active)	18287	42.395515	-82.902408
Refining Co/fruehauf Trailer	Part 211, NREPA - Underground Storage Tanks (Active)	39308	42.395751	-82.993906
Pvs Technologies Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37660	42.395809	-82.998181
Ortwein Concrete Yard	Part 211, NREPA - Underground Storage Tanks (Active)	830	42.395902	-82.998244
Parking Lot	Part 211, NREPA - Underground Storage Tanks (Active)	41461	42.39595384	-83.0352713
Pvs Chemicals Inc	Part 211, NREPA - Underground Storage Tanks (Active)	7303	42.396003	-82.994051
United Tulsa Oil Corp	Part 211, NREPA - Underground Storage Tanks (Active)	11911	42.396121	-82.957603
Maria Provenzano Revocable Trust	Part 211, NREPA - Underground Storage Tanks (Active)	36726	42.396409	-82.956809
Better Made Snack Foods Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	1366	42.396495	-83.002893
OZ Petroleum	Part 211, NREPA - Underground Storage Tanks (Active)	3216	42.396731	-82.955084
Fire Dept Engine #52	Part 211, NREPA - Underground Storage Tanks (Active)	19122	42.39689	-82.956151
Fayez Investemnt LLC	Part 211, NREPA - Underground Storage Tanks (Active)	1596	42.39716037	-82.98952852
Henry Ford Cottage Hospital	Part 211, NREPA - Underground Storage Tanks (Active)	16840	42.39732921	-82.9031969
Kenneth L. Mc Coy	Part 211, NREPA - Underground Storage Tanks (Active)	34971	42.397666	-82.950836
Detroit Equipment Repair	Part 211, NREPA - Underground Storage Tanks (Active)	37153	42.397723	-83.035155
Central Service Facility	Part 211, NREPA - Underground Storage Tanks (Active)	33149	42.397731	-83.034581
K & M Petro Inc	Part 211, NREPA - Underground Storage Tanks (Active)	34409	42.39815	-83.023074
Barclay Marine Distributor	Part 211, NREPA - Underground Storage Tanks (Active)	35630	42.398239	-83.000338
O J Transport Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	20877	42.398283	-83.001709
E & E Engineering, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	35778	42.398668	-82.985322
Amoco Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	21283	42.39869862	-82.99254807
Langone Services	Part 211, NREPA - Underground Storage Tanks (Active)	10499	42.39880443	-82.91873761
Amoco Oil Station #5608	Part 211, NREPA - Underground Storage Tanks (Active)	21310	42.399109	-82.948929
Hassan's Mini Mart	Part 211, NREPA - Underground Storage Tanks (Active)	1595	42.399365	-82.991502
David R Holman	Part 211, NREPA - Underground Storage Tanks (Active)	39711	42.399732	-82.981721
Father & Son Fuel Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	38482	42.400139	-83.023145
Van Mart Inc	Part 211, NREPA - Underground Storage Tanks (Active)	39697	42.400145	-83.022774
Detroit Forge Plant	Part 211, NREPA - Underground Storage Tanks (Active)	11577	42.400403	-83.028135
Former Gm Conner Stamping Plant	Part 211, NREPA - Underground Storage Tanks (Active)	11289	42.400595	-82.99313
B & G Towing	Part 211, NREPA - Underground Storage Tanks (Active)	37278	42.400896	-82.992964
Airport Trailer Coach Park	Part 211, NREPA - Underground Storage Tanks (Active)	3018	42.400932	-82.999954
Hasco Industries Inc	Part 211, NREPA - Underground Storage Tanks (Active)	50000021	42.400954	-82.999936
Mi Chrome & Chemical Co	Part 211, NREPA - Underground Storage Tanks (Active)	19798	42.401039	-83.017689
Corver Engineering Clinton Corp	Part 211, NREPA - Underground Storage Tanks (Active)	19965	42.401275	-83.009948
Grinnell Properties	Part 211, NREPA - Underground Storage Tanks (Active)	3084	42.401338	-83.007661
Reliable Architectural Metals Co	Part 211, NREPA - Underground Storage Tanks (Active)	12029	42.401343	-83.018027
Ray Laethem Pontiac-bu-gmc Inc	Part 211, NREPA - Underground Storage Tanks (Active)	9102	42.401464	-82.918092
US Equipment	Part 211, NREPA - Underground Storage Tanks (Active)	37645	42.401464	-83.003753
Swan Import Auto Service	Part 211, NREPA - Underground Storage Tanks (Active)	50000016	42.401561	-82.941714
W J Allemon Garden Supply Inc	Part 211, NREPA - Underground Storage Tanks (Active)	15802	42.402161	-82.91773
Sahari Enterprise	Part 211, NREPA - Underground Storage Tanks (Active)	16632	42.402189	-82.973485
Greater Rock Of Ages Cogic	Part 211, NREPA - Underground Storage Tanks (Active)	39093	42.40219	-82.99415
Gethsemane Cemetery	Part 211, NREPA - Underground Storage Tanks (Active)	37156	42.402343	-82.999413
BP/Amoco #5637	Part 211, NREPA - Underground Storage Tanks (Active)	5790	42.40284383	-82.91680106
Wayne Steel Progessing	Part 211, NREPA - Underground Storage Tanks (Active)	36999	42.402907	-83.002911
Detroit Police 15th Precinct	Part 211, NREPA - Underground Storage Tanks (Active)	19141	42.403169	-82.998441
Farms Auto Wash Inc	Part 211, NREPA - Underground Storage Tanks (Active)	14445	42.403236	-82.917166
Water Resources Recovery Facility	Part 211, NREPA - Underground Storage Tanks (Active)	21394	42.403477	-83.009837
Metro-east Substance Abuse Treat	Part 211, NREPA - Underground Storage Tanks (Active)	36746	42.40376	-82.968185
Chalmer Inc	Part 211, NREPA - Underground Storage Tanks (Active)	5733	42.403772	-82.964222
Meldrum Trucking & Landscaping	Part 211, NREPA - Underground Storage Tanks (Active)	50001889	42.404259	-82.916628
Motor Carrier Terminals	Part 211, NREPA - Underground Storage Tanks (Active)	2080	42.404381	-83.018167
Chrysler/acustar Detroit Axle	Part 211, NREPA - Underground Storage Tanks (Active)	16536	42.404774	-83.030698
Amoco Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	21288	42.404774	-83.037847
Pizza Hut/Former Gas Station `	Part 211, NREPA - Underground Storage Tanks (Active)	50005464	42.40492143	-82.9325351
Cassens Transport Co	Part 211, NREPA - Underground Storage Tanks (Active)	1680	42.404933	-83.021795
Motor City Electric Co	Part 211, NREPA - Underground Storage Tanks (Active)	19719	42.404953	-83.019962
Chrysler Detroit Marshalling Ctr	Part 211, NREPA - Underground Storage Tanks (Active)	4722	42.404969	-83.034766
Conner Service Co	Part 211, NREPA - Underground Storage Tanks (Active)	33292	42.405019	-82.997607
Pointe Dodge	Part 211, NREPA - Underground Storage Tanks (Active)	947	42.405132	-82.916167
City Of Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	50002345	42.405281	-82.988398
C & A Fuel	Part 211, NREPA - Underground Storage Tanks (Active)	10504	42.405411	-82.961542
Moe & Sons Mart LLC	Part 211, NREPA - Underground Storage Tanks (Active)	7366	42.405529	-82.964991
M C Petro	Part 211, NREPA - Underground Storage Tanks (Active)	33143	42.405588	-82.960894
National Car Rental	Part 211, NREPA - Underground Storage Tanks (Active)	21781	42.40562	-82.997203
Warren Cadieux Gas Mart	Part 211, NREPA - Underground Storage Tanks (Active)	18118	42.405702	-82.930408
FCA Transport LLC	Part 211, NREPA - Underground Storage Tanks (Active)	16154	42.406018	-83.013436
Amoco Oil Station #5655	Part 211, NREPA - Underground Storage Tanks (Active)	21312	42.406043	-82.929909
Grosse Pointe Farms	Part 211, NREPA - Underground Storage Tanks (Active)	201	42.406278	-82.892097
Sunoco Station	Part 211, NREPA - Underground Storage Tanks (Active)	40084	42.406692	-82.999733
Lochmoor Chrysler Jeep	Part 211, NREPA - Underground Storage Tanks (Active)	4548	42.406831	-82.915272
Chester Yavor	Part 211, NREPA - Underground Storage Tanks (Active)	5981	42.40694225	-82.9147143
Santoro	Part 211, NREPA - Underground Storage Tanks (Active)	41287	42.40700303	-82.95619054
Laith & R Mini Mart	Part 211, NREPA - Underground Storage Tanks (Active)	38352	42.407013	-82.926824
Police Dept Fleet Control	Part 211, NREPA - Underground Storage Tanks (Active)	19145	42.407082	-83.039446
Central Maintenance	Part 211, NREPA - Underground Storage Tanks (Active)	14398	42.407093	-83.043025
Grocery Store Warehouse	Part 211, NREPA - Underground Storage Tanks (Active)	50005334	42.407403	-82.914471
Grossepointe Motors Sales	Part 211, NREPA - Underground Storage Tanks (Active)	13808	42.407499	-82.914933
Russo Schebil Enterprises, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4549	42.407543	-82.914524

Site Name	Type	ID	Latitude	Longitude
Vacant Property (10000356)	Part 211, NREPA - Underground Storage Tanks (Active)	50006138	42.40789276	-83.02369411
Gunston & Gratiot	Part 211, NREPA - Underground Storage Tanks (Active)	5673	42.408033	-82.995567
Kentucky Fried Chicken	Part 211, NREPA - Underground Storage Tanks (Active)	37019	42.408048	-82.924846
City of Grosse Pointe Farms	Part 211, NREPA - Underground Storage Tanks (Active)	14411	42.408129	-82.88955
Former Sunoco Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005692	42.4085906	-82.9506504
City of Detroit Police Precinct #9	Part 211, NREPA - Underground Storage Tanks (Active)	19142	42.408613	-82.995177
Signature Flight Support	Part 211, NREPA - Underground Storage Tanks (Active)	2604	42.408743	-83.002788
Lynch Road Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	13212	42.409029	-83.009472
Vanopdenbosch Construction Co	Part 211, NREPA - Underground Storage Tanks (Active)	39639	42.409569	-82.919881
Artic Rentals Property	Part 211, NREPA - Underground Storage Tanks (Active)	12168	42.409571	-83.053405
Kerby Elementary School	Part 211, NREPA - Underground Storage Tanks (Active)	40940	42.409752	-82.901213
Friendly Restaurant #553	Part 211, NREPA - Underground Storage Tanks (Active)	50001955	42.410768	-82.912798
Charles Terrace	Part 211, NREPA - Underground Storage Tanks (Active)	38304	42.41107	-83.047157
Warren Canyon	Part 211, NREPA - Underground Storage Tanks (Active)	17209	42.411153	-82.916399
Mobil	Part 211, NREPA - Underground Storage Tanks (Active)	2393	42.411192	-83.005142
Country Club Of Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	11477	42.412151	-82.892334
Marathon Unit #1626	Part 211, NREPA - Underground Storage Tanks (Active)	13634	42.412795	-82.942241
The Brake Shop Of Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	36030	42.412953	-82.941521
Dpw Garage	Part 211, NREPA - Underground Storage Tanks (Active)	202	42.413177	-82.907574
Anthony Soave	Part 211, NREPA - Underground Storage Tanks (Active)	40985	42.413177	-82.884885
Clark	Part 211, NREPA - Underground Storage Tanks (Active)	35557	42.413296	-83.023248
Mike Ajami	Part 211, NREPA - Underground Storage Tanks (Active)	35532	42.413443	-83.008328
Forest Lawn Memorial Park	Part 211, NREPA - Underground Storage Tanks (Active)	36203	42.413904	-83.023638
Shell Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	10498	42.413953	-82.99166
Jerry Mickowski Buick	Part 211, NREPA - Underground Storage Tanks (Active)	8554	42.414012	-82.940115
Pointe Services	Part 211, NREPA - Underground Storage Tanks (Active)	10483	42.41435	-82.912032
Belle Tire Distributors Inc	Part 211, NREPA - Underground Storage Tanks (Active)	38104	42.414542	-82.911083
Thomas Gajewski	Part 211, NREPA - Underground Storage Tanks (Active)	10478	42.41462	-82.96461
Citgo	Part 211, NREPA - Underground Storage Tanks (Active)	40459	42.41503	-83.023176
Midwest Transportation	Part 211, NREPA - Underground Storage Tanks (Active)	35838	42.415215	-83.034697
Jacks Super Service	Part 211, NREPA - Underground Storage Tanks (Active)	9171	42.415329	-82.948862
D & D Plastics	Part 211, NREPA - Underground Storage Tanks (Active)	50001277	42.415331	-83.034329
Ba-do Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4387	42.415446	-82.949899
P F Laduke & Sons Roofing	Part 211, NREPA - Underground Storage Tanks (Active)	14488	42.415483	-83.031525
Sears Roebuck & Co	Part 211, NREPA - Underground Storage Tanks (Active)	38110	42.415519	-82.910744
Police Dept Precinct #11	Part 211, NREPA - Underground Storage Tanks (Active)	19137	42.415531	-83.061173
Detroit City Petroleum Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4917	42.415771	-83.061353
Safeway Transportation Inc	Part 211, NREPA - Underground Storage Tanks (Active)	7667	42.415802	-83.061794
Eastown Distributors	Part 211, NREPA - Underground Storage Tanks (Active)	15248	42.415815	-83.031284
Arrow Uniform Rental Inc	Part 211, NREPA - Underground Storage Tanks (Active)	17104	42.415889	-83.031232
Davison & Ryan Service	Part 211, NREPA - Underground Storage Tanks (Active)	39770	42.415889	-83.060228
Amil Aikassynonan	Part 211, NREPA - Underground Storage Tanks (Active)	16623	42.415992	-82.937092
Cassens Transport	Part 211, NREPA - Underground Storage Tanks (Active)	8497	42.416073	-83.026793
Marathon Unit #1267	Part 211, NREPA - Underground Storage Tanks (Active)	21723	42.416193	-82.97219
United (tulsa Oil Corp.) #36	Part 211, NREPA - Underground Storage Tanks (Active)	11893	42.416225	-82.96468
Harper Investments LLC	Part 211, NREPA - Underground Storage Tanks (Active)	8552	42.416276	-82.93716
Sana Mini Mart Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	5954	42.416281	-82.936407
Shell Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	14385	42.416295	-82.937119
Paramount Fabricating	Part 211, NREPA - Underground Storage Tanks (Active)	50000457	42.416423	-83.031266
Hala Mini Mart Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4914	42.416574	-82.936466
Marathon Unit #1182	Part 211, NREPA - Underground Storage Tanks (Active)	21550	42.416653	-82.964887
Cadillac Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	21873	42.416921	-83.030783
Brothers Gas & Food	Part 211, NREPA - Underground Storage Tanks (Active)	34401	42.417049	-82.972743
Warehouse Building	Part 211, NREPA - Underground Storage Tanks (Active)	41776	42.41710558	-83.03480635
Refari Fuel Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	15065	42.417258	-82.934662
Rto Quick Lube	Part 211, NREPA - Underground Storage Tanks (Active)	34270	42.417454	-82.934921
GP Petro Inc	Part 211, NREPA - Underground Storage Tanks (Active)	21473	42.41746187	-82.91012236
Lakepointe Collision	Part 211, NREPA - Underground Storage Tanks (Active)	40914	42.417512	-82.954914
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005874	42.41766602	-82.98921748
Franklin Jones	Part 211, NREPA - Underground Storage Tanks (Active)	50000456	42.418064	-82.972992
Safe Aquisition Com LLC	Part 211, NREPA - Underground Storage Tanks (Active)	19870	42.418513	-82.988202
3640 McNichols Property LLC	Part 211, NREPA - Underground Storage Tanks (Active)	14937	42.418542	-83.064346
Sylhet Motors and Service LLC	Part 211, NREPA - Underground Storage Tanks (Active)	41182	42.418763	-83.062155
St John Hospital	Part 211, NREPA - Underground Storage Tanks (Active)	12169	42.418836	-82.914673
Mitch Binkowski	Part 211, NREPA - Underground Storage Tanks (Active)	35614	42.418868	-83.047571
D & H Auto	Part 211, NREPA - Underground Storage Tanks (Active)	17706	42.418981	-83.042485
Eagle Fly Petro	Part 211, NREPA - Underground Storage Tanks (Active)	18527	42.419058	-83.039047
BHGI Company	Part 211, NREPA - Underground Storage Tanks (Active)	35357	42.419077	-83.052696
Allied Towing	Part 211, NREPA - Underground Storage Tanks (Active)	8626	42.419088	-83.050167
Federal Pipe & Supply Co	Part 211, NREPA - Underground Storage Tanks (Active)	7392	42.419121	-83.036146
6556 McNichols	Part 211, NREPA - Underground Storage Tanks (Active)	19920	42.41914	-83.035217
Whittier-whitehill Service	Part 211, NREPA - Underground Storage Tanks (Active)	8837	42.419142	-82.958109
National Steel Corp	Part 211, NREPA - Underground Storage Tanks (Active)	6279	42.419241	-83.029378
Hare Leasing Inc	Part 211, NREPA - Underground Storage Tanks (Active)	3719	42.419291	-83.026628
Joseph & Mike Semma	Part 211, NREPA - Underground Storage Tanks (Active)	21416	42.419332	-83.03903
J. Fons Co	Part 211, NREPA - Underground Storage Tanks (Active)	3138	42.419392	-83.036302
Repair Ind	Part 211, NREPA - Underground Storage Tanks (Active)	35702	42.419411	-83.035382
Safeway Acquisition Co LLC	Part 211, NREPA - Underground Storage Tanks (Active)	12267	42.419452	-82.96382
Baayoun Service Inc	Part 211, NREPA - Underground Storage Tanks (Active)	6204	42.419483	-83.031309
Joseph Strobl	Part 211, NREPA - Underground Storage Tanks (Active)	36093	42.4195	-82.959744
City Of Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	10785	42.41951	-83.013866
Eagles Petroleum Inc	Part 211, NREPA - Underground Storage Tanks (Active)	2147	42.419527	-83.012558
Silva Catering Co	Part 211, NREPA - Underground Storage Tanks (Active)	33319	42.419596	-83.051273
Mouhajer Enterprises Inc	Part 211, NREPA - Underground Storage Tanks (Active)	35351	42.419613	-83.023851
Mt Olivet Cemetery	Part 211, NREPA - Underground Storage Tanks (Active)	36823	42.419622	-83.023479
My Six & Gunston Sunoco LLC	Part 211, NREPA - Underground Storage Tanks (Active)	2392	42.419931	-83.003486
American Car Care East Inc	Part 211, NREPA - Underground Storage Tanks (Active)	39477	42.420001	-82.960193
Mobil Oil Corp	Part 211, NREPA - Underground Storage Tanks (Active)	3217	42.420065	-83.00396
Southland Corp Property #20156	Part 211, NREPA - Underground Storage Tanks (Active)	50002017	42.420139	-83.002921
Houston Mini Mart	Part 211, NREPA - Underground Storage Tanks (Active)	33177	42.420232	-82.974384
Fire Dept Engine #50	Part 211, NREPA - Underground Storage Tanks (Active)	19120	42.420475	-82.983649
Aureus Holdings	Part 211, NREPA - Underground Storage Tanks (Active)	14334	42.420488	-83.038619
Ruzoija Ljuljanovic	Part 211, NREPA - Underground Storage Tanks (Active)	10187	42.420914	-83.047034
Saran Protective Coatings Co	Part 211, NREPA - Underground Storage Tanks (Active)	16268	42.421084	-83.059234
Franklin Land Holdings LLC	Part 211, NREPA - Underground Storage Tanks (Active)	20313	42.421142	-83.03866
Strobl Construction Co	Part 211, NREPA - Underground Storage Tanks (Active)	6976	42.421215	-83.046241
Delta Resins & Refractories, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	582	42.421295	-83.062314
Mataway Service Inc	Part 211, NREPA - Underground Storage Tanks (Active)	34399	42.421403	-82.999504
Detroit Car Wash	Part 211, NREPA - Underground Storage Tanks (Active)	19290	42.421408	-82.999482
Metropolitan Alloys Corp	Part 211, NREPA - Underground Storage Tanks (Active)	6236	42.421458	-83.062689
Ibrahim Auto Repair	Part 211, NREPA - Underground Storage Tanks (Active)	6222	42.421648	-83.045085
Capitol Mfg Co	Part 211, NREPA - Underground Storage Tanks (Active)	37474	42.421816	-83.045457
Conway Cleaners	Part 211, NREPA - Underground Storage Tanks (Active)	17902	42.421865	-82.962635
Wakay Ind	Part 211, NREPA - Underground Storage Tanks (Active)	991	42.421906	-83.038678
American Vault & Conrete Prod.	Part 211, NREPA - Underground Storage Tanks (Active)	18334	42.421964	-83.065954
Evergreen Home & Garden Ctr.	Part 211, NREPA - Underground Storage Tanks (Active)	12488	42.422236	-82.998025
Romin Iron & Metal Inc	Part 211, NREPA - Underground Storage Tanks (Active)	38029	42.422369	-83.065812
Fire Dept Engine #47	Part 211, NREPA - Underground Storage Tanks (Active)	19117	42.422369	-83.038697

Site Name	Type	ID	Latitude	Longitude
Ryan Correctional Facility	Part 211, NREPA - Underground Storage Tanks (Active)	50002477	42.422449	-83.062342
Mack Prestwick Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	50001942	42.422474	-82.910189
Davison & Mound Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	41363	42.42264544	-83.04262315
Al's Auto Repair Service	Part 211, NREPA - Underground Storage Tanks (Active)	35425	42.423092	-82.942099
Amoco Oil Station #5642	Part 211, NREPA - Underground Storage Tanks (Active)	21314	42.423106	-82.965269
Gratiot & Alcoy	Part 211, NREPA - Underground Storage Tanks (Active)	38562	42.423366	-82.985517
Mound Correctional Facility	Part 211, NREPA - Underground Storage Tanks (Active)	50002478	42.423572	-83.04345
Everrett Delivery Service	Part 211, NREPA - Underground Storage Tanks (Active)	10741	42.423622	-83.037407
Former Arnold Tool	Part 211, NREPA - Underground Storage Tanks (Active)	50005754	42.42410556	-83.03827396
Detroit Car Care Center	Part 211, NREPA - Underground Storage Tanks (Active)	5265	42.424126	-82.991923
Leonard Fountain Specialities, I	Part 211, NREPA - Underground Storage Tanks (Active)	1204	42.424348	-83.062766
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005685	42.42465617	-83.03888041
Marmon / Keystone Corp Huron Street	Part 211, NREPA - Underground Storage Tanks (Active)	41537	42.42474003	-83.06273716
K & N Auto Body	Part 211, NREPA - Underground Storage Tanks (Active)	36888	42.424761	-82.984609
Denby High School	Part 211, NREPA - Underground Storage Tanks (Active)	5453	42.4248	-82.960425
Former Harper Avenue Filling Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005320	42.42481068	-82.92864256
B & S Oil Inc	Part 211, NREPA - Underground Storage Tanks (Active)	8233	42.424935	-82.947738
Judd Warehousing LLC	Part 211, NREPA - Underground Storage Tanks (Active)	16130	42.42532	-83.053782
Monteith Elementary School	Part 211, NREPA - Underground Storage Tanks (Active)	40936	42.425473	-82.903623
M N B Service	Part 211, NREPA - Underground Storage Tanks (Active)	19898	42.425624	-82.98776
#52-9652-053	Part 211, NREPA - Underground Storage Tanks (Active)	21591	42.425649	-83.043182
Republic Waste Services of Michigan	Part 211, NREPA - Underground Storage Tanks (Active)	37845	42.425854	-83.057384
Master Metals	Part 211, NREPA - Underground Storage Tanks (Active)	39944	42.425876	-83.056415
Cadillac Coffee Co	Part 211, NREPA - Underground Storage Tanks (Active)	391	42.425887	-83.055873
Conant Gas and Quick Mart	Part 211, NREPA - Underground Storage Tanks (Active)	33688	42.425938	-83.068794
Sana Energy & Management Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10486	42.425948	-82.926827
MDOC - Detroit Regional Correction Facility	Part 211, NREPA - Underground Storage Tanks (Active)	33026	42.425958	-83.052809
Police Dept Pct #11	Part 211, NREPA - Underground Storage Tanks (Active)	36588	42.42598	-83.051757
Van Dyke Petro LLC	Part 211, NREPA - Underground Storage Tanks (Active)	19202	42.426104	-83.023744
Ajax Materials Corp	Part 211, NREPA - Underground Storage Tanks (Active)	13329	42.426117	-83.04554
Former Braver Lumber	Part 211, NREPA - Underground Storage Tanks (Active)	50002621	42.426123	-83.049803
Nationwide Papers	Part 211, NREPA - Underground Storage Tanks (Active)	3269	42.426147	-83.044258
Frank Ulbrik	Part 211, NREPA - Underground Storage Tanks (Active)	50002557	42.426281	-83.062841
Draw Tree Inc	Part 211, NREPA - Underground Storage Tanks (Active)	38588	42.426285	-83.068622
J. Fons Co	Part 211, NREPA - Underground Storage Tanks (Active)	36361	42.426326	-83.035766
Barnes School	Part 211, NREPA - Underground Storage Tanks (Active)	40935	42.426327	-82.889828
Wfj Ready Mix	Part 211, NREPA - Underground Storage Tanks (Active)	34829	42.426519	-83.038877
Franks Nursery	Part 211, NREPA - Underground Storage Tanks (Active)	35691	42.42655	-83.03769
Franks Nursery & Crafts	Part 211, NREPA - Underground Storage Tanks (Active)	50002037	42.426602	-83.035681
Mercury Gage Co	Part 211, NREPA - Underground Storage Tanks (Active)	34017	42.426616	-83.035068
Mt Zion Church	Part 211, NREPA - Underground Storage Tanks (Active)	50002127	42.426664	-82.984539
Mt Olivet Service Area	Part 211, NREPA - Underground Storage Tanks (Active)	50001041	42.426855	-83.013226
Speedy	Part 211, NREPA - Underground Storage Tanks (Active)	34255	42.426912	-82.984731
Pan-glo Detroit	Part 211, NREPA - Underground Storage Tanks (Active)	13656	42.427089	-83.033439
Unoccupied	Part 211, NREPA - Underground Storage Tanks (Active)	50001956	42.427282	-83.014088
Flagstar Bank	Part 211, NREPA - Underground Storage Tanks (Active)	2441	42.427649	-82.909513
Detroit Pingree Bldg CO (M16102)	Part 211, NREPA - Underground Storage Tanks (Active)	11691	42.427765	-82.984596
Kuality Kar Kare	Part 211, NREPA - Underground Storage Tanks (Active)	21432	42.427776	-82.954478
Zenith Color TV	Part 211, NREPA - Underground Storage Tanks (Active)	50005248	42.42779718	-83.02382941
Gayle Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	34961	42.427885	-83.024182
Grosse Pointe Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	16641	42.428231	-82.909068
Park Place Of Harper Woods	Part 211, NREPA - Underground Storage Tanks (Active)	18547	42.428251	-82.922139
Standard Auto Supply	Part 211, NREPA - Underground Storage Tanks (Active)	50000030	42.428286	-82.982309
Sunoco 0008-2651	Part 211, NREPA - Underground Storage Tanks (Active)	5948	42.428875	-82.956451
N & J	Part 211, NREPA - Underground Storage Tanks (Active)	10479	42.429297	-82.957411
Fueling Deport	Part 211, NREPA - Underground Storage Tanks (Active)	42022	42.429752	-83.036691
Harper Woods Garage	Part 211, NREPA - Underground Storage Tanks (Active)	11638	42.429811	-82.924289
Gratiot Bump Shop	Part 211, NREPA - Underground Storage Tanks (Active)	36738	42.430125	-82.980682
PTI	Part 211, NREPA - Underground Storage Tanks (Active)	36114	42.430284	-83.034065
Pershing High School	Part 211, NREPA - Underground Storage Tanks (Active)	5459	42.431646	-83.063288
7 Mile Road Yard	Part 211, NREPA - Underground Storage Tanks (Active)	11305	42.431797	-83.037553
Vacant Property	Part 211, NREPA - Underground Storage Tanks (Active)	50001585	42.431811	-82.979573
Detroit Twinbrook CO (M16108)	Part 211, NREPA - Underground Storage Tanks (Active)	11686	42.431827	-83.062932
Abandoned Site	Part 211, NREPA - Underground Storage Tanks (Active)	50005163	42.4319698	-83.06326212
J & J Tire & Auto Center	Part 211, NREPA - Underground Storage Tanks (Active)	33162	42.432077	-83.023968
City Of Harper Woods Fire Dept.	Part 211, NREPA - Underground Storage Tanks (Active)	15199	42.432084	-82.924296
Rick Kenaan	Part 211, NREPA - Underground Storage Tanks (Active)	4233	42.432295	-82.979667
Qdw/queens Chapel	Part 211, NREPA - Underground Storage Tanks (Active)	35958	42.432869	-83.073877
Micks Auto	Part 211, NREPA - Underground Storage Tanks (Active)	37091	42.433119	-83.060871
Shaif Group 3 LLC	Part 211, NREPA - Underground Storage Tanks (Active)	5786	42.433341	-83.063794
Seven Mile & Ryan	Part 211, NREPA - Underground Storage Tanks (Active)	10450	42.433405	-83.062338
F & I Food Mart Inc	Part 211, NREPA - Underground Storage Tanks (Active)	2286	42.433443	-83.045725
Al-Fakih Properties LLC	Part 211, NREPA - Underground Storage Tanks (Active)	41275	42.43351044	-83.02397758
Solaiman Mini Mart LLC	Part 211, NREPA - Underground Storage Tanks (Active)	38315	42.433533	-83.053473
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005419	42.43356	-82.90896
Franklin Land Holdings LLC	Part 211, NREPA - Underground Storage Tanks (Active)	41322	42.43367116	-83.0441263
J.I. Hughley Inc	Part 211, NREPA - Underground Storage Tanks (Active)	34773	42.433709	-83.03382
Tens Auto Wash	Part 211, NREPA - Underground Storage Tanks (Active)	18744	42.433851	-83.039697
Durako Paint & Color Corp	Part 211, NREPA - Underground Storage Tanks (Active)	16208	42.433868	-83.038685
Shell Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	10445	42.43389	-83.023678
Terminal Steel & Equipment Co	Part 211, NREPA - Underground Storage Tanks (Active)	624	42.433947	-83.035614
Nortown Convenience	Part 211, NREPA - Underground Storage Tanks (Active)	34366	42.433983	-83.033831
K I Investment	Part 211, NREPA - Underground Storage Tanks (Active)	18511	42.434054	-83.014594
Uhaul 752-54	Part 211, NREPA - Underground Storage Tanks (Active)	15346	42.434175	-83.02307
Philmar L.c.c (formerly U-metro)	Part 211, NREPA - Underground Storage Tanks (Active)	38865	42.434293	-83.016721
Osborn High School	Part 211, NREPA - Underground Storage Tanks (Active)	5456	42.434298	-83.004455
Beedy Enterprises Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	13639	42.434328	-83.014571
Vivoma Auto Wash Inc	Part 211, NREPA - Underground Storage Tanks (Active)	17145	42.434408	-82.953068
Maxx Beauty Supply	Part 211, NREPA - Underground Storage Tanks (Active)	50005706	42.43441072	-82.97856827
Wasik Funeral Home Inc	Part 211, NREPA - Underground Storage Tanks (Active)	21884	42.434512	-82.996961
Oscar Salery	Part 211, NREPA - Underground Storage Tanks (Active)	40298	42.434548	-83.005444
Citgo	Part 211, NREPA - Underground Storage Tanks (Active)	2294	42.434572	-83.004459
12700 East 7 Mile	Part 211, NREPA - Underground Storage Tanks (Active)	50005247	42.43460266	-82.99439497
Amoco Oil #6406	Part 211, NREPA - Underground Storage Tanks (Active)	4963	42.434671	-82.952947
#52-9106-025	Part 211, NREPA - Underground Storage Tanks (Active)	21849	42.434786	-82.996978
A.N.S. Auto Repair Inc	Part 211, NREPA - Underground Storage Tanks (Active)	38505	42.434844	-82.985924
Consolidated Unit #2249	Part 211, NREPA - Underground Storage Tanks (Active)	17442	42.434871	-82.985092
Ajrouche 7 Mile LLC	Part 211, NREPA - Underground Storage Tanks (Active)	40494	42.43490062	-82.99347533
13033 Seven Mile LLC	Part 211, NREPA - Underground Storage Tanks (Active)	39231	42.434959	-82.99106
Chalmers Service	Part 211, NREPA - Underground Storage Tanks (Active)	11897	42.43496	-82.974608
Amoco Oil Station #7219	Part 211, NREPA - Underground Storage Tanks (Active)	21321	42.435062	-82.983195
Former Joe's Marathon Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005348	42.43509333	-82.95386122
Former Advance Auto Center Site	Part 211, NREPA - Underground Storage Tanks (Active)	41448	42.43509616	-82.97929321
Sulaiman Enterprises LLC	Part 211, NREPA - Underground Storage Tanks (Active)	35028	42.435146	-82.985107
Office Building	Part 211, NREPA - Underground Storage Tanks (Active)	10893	42.435209	-82.92116
Grosse Pointe Yacht Club	Part 211, NREPA - Underground Storage Tanks (Active)	18432	42.435244	-82.875845
Janush Brothers Moving & Storage	Part 211, NREPA - Underground Storage Tanks (Active)	18244	42.43529	-83.075553
Najar Petroleum LLC	Part 211, NREPA - Underground Storage Tanks (Active)	5951	42.435556	-82.965

Site Name	Type	ID	Latitude	Longitude
Frank Calcaterra Funeral Home	Part 211, NREPA - Underground Storage Tanks (Active)	50002049	42.435631	-82.955617
Former Ned's Firestone Store	Part 211, NREPA - Underground Storage Tanks (Active)	40007	42.435686	-82.977019
Frankel Metal Co	Part 211, NREPA - Underground Storage Tanks (Active)	50000001	42.435904	-83.037604
Gasper Robino	Part 211, NREPA - Underground Storage Tanks (Active)	13122	42.4361	-82.951732
Permawick Co	Part 211, NREPA - Underground Storage Tanks (Active)	10024	42.436314	-83.014362
Jerry Burton	Part 211, NREPA - Underground Storage Tanks (Active)	39084	42.436322	-83.014362
Village of Grosse Pointe Shores	Part 211, NREPA - Underground Storage Tanks (Active)	1296	42.437053	-82.877318
Puritan St Church Of Christ Inc	Part 211, NREPA - Underground Storage Tanks (Active)	39960	42.437222	-83.076957
Greening Testing Laboratories	Part 211, NREPA - Underground Storage Tanks (Active)	8384	42.437431	-83.039279
Montgomery Wards	Part 211, NREPA - Underground Storage Tanks (Active)	50002422	42.437498	-82.976242
Goodyear Tire & Rubber Co #1539	Part 211, NREPA - Underground Storage Tanks (Active)	21714	42.438324	-82.975287
Quick Stop Brake Shop Inc	Part 211, NREPA - Underground Storage Tanks (Active)	34827	42.438405	-83.024624
Down River Maintenance Corp	Part 211, NREPA - Underground Storage Tanks (Active)	1013	42.438623	-83.010774
Toms Marathon Service	Part 211, NREPA - Underground Storage Tanks (Active)	4234	42.438702	-82.908026
Atlas Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	17448	42.438943	-83.076397
Denton Enterprises, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	18349	42.439156	-82.907969
Curto Enterprises	Part 211, NREPA - Underground Storage Tanks (Active)	10906	42.43928	-82.919453
Randazzos Fruit Market	Part 211, NREPA - Underground Storage Tanks (Active)	50001796	42.4394	-83.044234
Elliott	Part 211, NREPA - Underground Storage Tanks (Active)	41879	42.43963774	-83.03946213
Fire Dept Engine #60	Part 211, NREPA - Underground Storage Tanks (Active)	19127	42.440209	-83.00509
Former Creative Industries	Part 211, NREPA - Underground Storage Tanks (Active)	40490	42.440587	-83.051403
Abys American Gas Inc	Part 211, NREPA - Underground Storage Tanks (Active)	33163	42.440685	-83.024357
Kmart #4027	Part 211, NREPA - Underground Storage Tanks (Active)	781	42.440878	-83.035939
Outer Drive Mfg Tech Center	Part 211, NREPA - Underground Storage Tanks (Active)	1727	42.440963	-83.040207
Jesses Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	3124	42.441018	-82.97351
Fitzsimons Manufacturing Co	Part 211, NREPA - Underground Storage Tanks (Active)	50	42.441063	-83.038689
AT & T Michigan Detroit NE Garage & Storeroom	Part 211, NREPA - Underground Storage Tanks (Active)	11652	42.441099	-83.013033
#53-9106-057	Part 211, NREPA - Underground Storage Tanks (Active)	19782	42.441117	-82.947769
Amoco SS #5460	Part 211, NREPA - Underground Storage Tanks (Active)	5804	42.441256	-83.024385
Chrysler LLC	Part 211, NREPA - Underground Storage Tanks (Active)	12751	42.441333	-83.017973
Holy Cross Hospital	Part 211, NREPA - Underground Storage Tanks (Active)	7747	42.441451	-83.020636
14534 Tacoma	Part 211, NREPA - Underground Storage Tanks (Active)	14494	42.44158	-82.972911
Parcells Middle School	Part 211, NREPA - Underground Storage Tanks (Active)	40941	42.441955	-82.907138
PDS Properties - Mr Frank Sheker	Part 211, NREPA - Underground Storage Tanks (Active)	10270	42.442058	-83.005177
Franks Nursery Warehouse (former	Part 211, NREPA - Underground Storage Tanks (Active)	37757	42.442167	-83.005181
Whittar Steel Strip	Part 211, NREPA - Underground Storage Tanks (Active)	11473	42.442293	-83.034523
United Parcel Service	Part 211, NREPA - Underground Storage Tanks (Active)	13945	42.442348	-83.005189
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005229	42.442763	-82.972555
Mason Elementary School	Part 211, NREPA - Underground Storage Tanks (Active)	40933	42.442866	-82.904062
Amoco SS #5644	Part 211, NREPA - Underground Storage Tanks (Active)	5788	42.442998	-82.907285
BCA of Detroit LLC	Part 211, NREPA - Underground Storage Tanks (Active)	1616	42.443287	-82.970595
Fayez Aliahmad	Part 211, NREPA - Underground Storage Tanks (Active)	2085	42.44330227	-82.94555434
Hoover Yard	Part 211, NREPA - Underground Storage Tanks (Active)	8527	42.443358	-83.005237
Arctic Maintenance	Part 211, NREPA - Underground Storage Tanks (Active)	2458	42.443638	-83.004876
Mack & Vernier Inc	Part 211, NREPA - Underground Storage Tanks (Active)	16613	42.44367778	-82.90620097
Ferry Elementary School	Part 211, NREPA - Underground Storage Tanks (Active)	40938	42.443753	-82.88527
Air Products & Chemicals Inc	Part 211, NREPA - Underground Storage Tanks (Active)	19536	42.443969	-83.034607
Judd Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	7703	42.444441	-83.03463
Marathon	Part 211, NREPA - Underground Storage Tanks (Active)	12378	42.444713	-83.024549
Fife-Pearce Electric Co	Part 211, NREPA - Underground Storage Tanks (Active)	41750	42.44473169	-83.03432942
St Raymonds Church	Part 211, NREPA - Underground Storage Tanks (Active)	14694	42.44481	-82.990695
Chrysler LLC - Mound Road Engine	Part 211, NREPA - Underground Storage Tanks (Active)	10079	42.445133	-83.044112
15130 Gratiot Avenue LLC	Part 211, NREPA - Underground Storage Tanks (Active)	20317	42.445419	-82.970619
Hassan Karnib	Part 211, NREPA - Underground Storage Tanks (Active)	3716	42.44544268	-82.91650602
Cueter Brothers Service	Part 211, NREPA - Underground Storage Tanks (Active)	15840	42.445905	-82.907018
Regina High School	Part 211, NREPA - Underground Storage Tanks (Active)	7652	42.446185	-82.944349
BP	Part 211, NREPA - Underground Storage Tanks (Active)	17463	42.44632781	-82.91603931
Notre Dame High School	Part 211, NREPA - Underground Storage Tanks (Active)	117	42.446626	-82.943417
BP	Part 211, NREPA - Underground Storage Tanks (Active)	19368	42.446859	-83.084213
8 Mile & Mitchell Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	10210	42.447059	-83.072943
Terry's Auto Repair	Part 211, NREPA - Underground Storage Tanks (Active)	37188	42.447073	-83.071941
Sami Service Co	Part 211, NREPA - Underground Storage Tanks (Active)	19191	42.44709	-83.07099
Michigan Motor Exchange	Part 211, NREPA - Underground Storage Tanks (Active)	38902	42.447109	-83.069907
Quick Stop & Go Inc	Part 211, NREPA - Underground Storage Tanks (Active)	16096	42.447177	-83.065767
Former Gasoline Station	Part 211, NREPA - Underground Storage Tanks (Active)	41249	42.447179	-83.076491
8 Mile Gas & Food	Part 211, NREPA - Underground Storage Tanks (Active)	38752	42.447197	-83.063752
Clark Oil #546	Part 211, NREPA - Underground Storage Tanks (Active)	36480	42.447208	-83.062639
A & A Petro Mart	Part 211, NREPA - Underground Storage Tanks (Active)	19947	42.447222	-83.044577
Amoco Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	21231	42.447246	-82.969558
General Motors Corp	Part 211, NREPA - Underground Storage Tanks (Active)	21779	42.447329	-83.034769
Former Cooper Yard Site	Part 211, NREPA - Underground Storage Tanks (Active)	42120	42.44741159	-83.03643181
Towne Inc	Part 211, NREPA - Underground Storage Tanks (Active)	38567	42.447435	-83.051533
BP Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	40174	42.447627	-83.044199
Intrastate Distributors Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	2130	42.447734	-83.038659
Eastland Center	Part 211, NREPA - Underground Storage Tanks (Active)	7448	42.44781	-82.933785
Wood Motors Inc	Part 211, NREPA - Underground Storage Tanks (Active)	12876	42.447922	-82.969432
8 Mile Petro Mart	Part 211, NREPA - Underground Storage Tanks (Active)	40977	42.447927	-83.054055
8076 Property LLC	Part 211, NREPA - Underground Storage Tanks (Active)	37108	42.447963	-83.023075
Cornillie Fuel & Supply Inc	Part 211, NREPA - Underground Storage Tanks (Active)	916	42.448149	-83.005334
Mobil & Cymen Site (jawad)	Part 211, NREPA - Underground Storage Tanks (Active)	50001328	42.448159	-83.049519
Former Speedway	Part 211, NREPA - Underground Storage Tanks (Active)	41152	42.448203	-83.021387
Shell Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	10464	42.448288	-83.044956
Northeast Water Treatment Plant	Part 211, NREPA - Underground Storage Tanks (Active)	33142	42.448316	-83.01426
Northeast Station	Part 211, NREPA - Underground Storage Tanks (Active)	21648	42.448351	-83.038198
Warren Office & Warehouse	Part 211, NREPA - Underground Storage Tanks (Active)	19079	42.448415	-83.036027
Fpt Auto Shred Division Inc	Part 211, NREPA - Underground Storage Tanks (Active)	2601	42.448459	-83.009453
Hassan Fahs	Part 211, NREPA - Underground Storage Tanks (Active)	14324	42.448648	-83.023381
Community Central Bank	Part 211, NREPA - Underground Storage Tanks (Active)	42079	42.4486991	-82.90498407
Unknown	Part 211, NREPA - Underground Storage Tanks (Active)	50005770	42.44882283	-83.02523724
Wood Motors Inc	Part 211, NREPA - Underground Storage Tanks (Active)	12164	42.448884	-82.968817
Assi Real Estate LLC	Part 211, NREPA - Underground Storage Tanks (Active)	2207	42.448935	-83.020103
Carboloy Inc	Part 211, NREPA - Underground Storage Tanks (Active)	17122	42.449117	-83.008843
Sabiston Building Supply Inc	Part 211, NREPA - Underground Storage Tanks (Active)	14133	42.44914	-83.007241
Marathon Unit #1273	Part 211, NREPA - Underground Storage Tanks (Active)	18117	42.449196	-82.985633
Royal Carpet Distributors	Part 211, NREPA - Underground Storage Tanks (Active)	20986	42.449218	-83.006652
Guardian Steel Corp	Part 211, NREPA - Underground Storage Tanks (Active)	37324	42.449249	-83.004473
C.j Link Lumber Co	Part 211, NREPA - Underground Storage Tanks (Active)	18738	42.449296	-83.003984
Minit-lube #1400	Part 211, NREPA - Underground Storage Tanks (Active)	4871	42.449328	-82.980008
Haveen Inc	Part 211, NREPA - Underground Storage Tanks (Active)	19193	42.449352	-82.978225
Central Metal	Part 211, NREPA - Underground Storage Tanks (Active)	37685	42.449381	-83.000906
Union Oil Co Of California	Part 211, NREPA - Underground Storage Tanks (Active)	21559	42.449399	-82.975687
Eastland Imports Inc	Part 211, NREPA - Underground Storage Tanks (Active)	1159	42.44941	-82.975397
Marathon Unit #1351	Part 211, NREPA - Underground Storage Tanks (Active)	13601	42.449438	-82.998372
Don Gooley Cadillac, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	15053	42.449463	-82.915624
Alaa Petroleum Inc	Part 211, NREPA - Underground Storage Tanks (Active)	5737	42.449638	-83.00157
J & Z Petroleum	Part 211, NREPA - Underground Storage Tanks (Active)	36780	42.449724	-82.986059
Al-Oud LLLC	Part 211, NREPA - Underground Storage Tanks (Active)	3218	42.449733	-82.9678
O B Property	Part 211, NREPA - Underground Storage Tanks (Active)	8816	42.449761	-82.965961

Site Name	Type	ID	Latitude	Longitude
Robert K Yeager	Part 211, NREPA - Underground Storage Tanks (Active)	35095	42.449818	-82.962376
Dept of Public Works	Part 211, NREPA - Underground Storage Tanks (Active)	8778	42.44983077	-82.89110013
City of Harper Woods	Part 211, NREPA - Underground Storage Tanks (Active)	7302	42.449975	-82.925668
The Milbrand Co	Part 211, NREPA - Underground Storage Tanks (Active)	36138	42.450017	-82.985662
Al Longford, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4547	42.45002	-82.974862
Sadina Mini Mart	Part 211, NREPA - Underground Storage Tanks (Active)	16365	42.45003998	-82.94058689
Unit #22-101	Part 211, NREPA - Underground Storage Tanks (Active)	19035	42.450079	-82.948153
Firestone Master Care Center	Part 211, NREPA - Underground Storage Tanks (Active)	15990	42.450138	-82.936552
Drummy Oldsmobile	Part 211, NREPA - Underground Storage Tanks (Active)	1532	42.450265	-82.968706
Car Wash Facility	Part 211, NREPA - Underground Storage Tanks (Active)	50002331	42.450276	-82.967903
Coleman Rent To Own	Part 211, NREPA - Underground Storage Tanks (Active)	33057	42.450315	-82.963671
Mound Substation	Part 211, NREPA - Underground Storage Tanks (Active)	50005508	42.45040755	-83.03765217
BP Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	10490	42.45041	-82.966422
Macomb Park Elementary	Part 211, NREPA - Underground Storage Tanks (Active)	40898	42.450488	-83.00974
Evergreen Home & Garden Center I	Part 211, NREPA - Underground Storage Tanks (Active)	1298	42.450683	-82.954754
0626 17087 East 8 Mile	Part 211, NREPA - Underground Storage Tanks (Active)	12383	42.450688	-82.945675
Jiffy Lube #1131	Part 211, NREPA - Underground Storage Tanks (Active)	16711	42.450724	-82.942683
IS Real Estate LLC	Part 211, NREPA - Underground Storage Tanks (Active)	5650	42.450867	-82.936452
Ed's Service Station Inc	Part 211, NREPA - Underground Storage Tanks (Active)	16701	42.451053	-82.91502
Aureus Holdings LTD	Part 211, NREPA - Underground Storage Tanks (Active)	41970	42.45134856	-83.00499107
K & B Mounting, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4283	42.451437	-83.044785
Marathon Unit 2755	Part 211, NREPA - Underground Storage Tanks (Active)	18187	42.451858	-83.025821
Fuel Point Inc	Part 211, NREPA - Underground Storage Tanks (Active)	13994	42.45255053	-82.93818363
Midwest Fuel	Part 211, NREPA - Underground Storage Tanks (Active)	34295	42.453215	-83.025333
Sahara Construction Co	Part 211, NREPA - Underground Storage Tanks (Active)	40610	42.453451	-83.025803
Reno Machinery & Engr Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37478	42.453724	-83.00567
Desilvas Tune-up Center	Part 211, NREPA - Underground Storage Tanks (Active)	14766	42.45398	-82.964768
Edsel & Eleanor Ford House	Part 211, NREPA - Underground Storage Tanks (Active)	8627	42.4543338	-82.87367577
Desilva Automotive	Part 211, NREPA - Underground Storage Tanks (Active)	50000575	42.45452473	-82.96402887
Richard Desilva	Part 211, NREPA - Underground Storage Tanks (Active)	50000071	42.45453159	-82.96432912
Gibbs Machinery Co	Part 211, NREPA - Underground Storage Tanks (Active)	36800	42.454759	-83.005337
Cct De'couper Ind	Part 211, NREPA - Underground Storage Tanks (Active)	39817	42.454995	-83.00572
Schoenherr Iron Works	Part 211, NREPA - Underground Storage Tanks (Active)	37961	42.455042	-82.986201
Rene Vanassche & Sons Co	Part 211, NREPA - Underground Storage Tanks (Active)	39749	42.455118	-82.998073
Equipment Manufacturing	Part 211, NREPA - Underground Storage Tanks (Active)	50000365	42.455137	-83.005352
Auto Hut Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	3887	42.455162	-82.902805
Zazz Fuel Mart LLC	Part 211, NREPA - Underground Storage Tanks (Active)	16481	42.455335	-82.91222
John Lutpy	Part 211, NREPA - Underground Storage Tanks (Active)	5609	42.455485	-82.901567
Wolverine Metal Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	36143	42.455495	-83.005738
Kliffel Tire	Part 211, NREPA - Underground Storage Tanks (Active)	37100	42.455605	-82.964508
Van Dyke & Toepfor Gas & More Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	10459	42.45583	-83.026613
Rem & Sons Mechanical Contractor	Part 211, NREPA - Underground Storage Tanks (Active)	21193	42.455929	-82.985858
Cargoflow Facility	Part 211, NREPA - Underground Storage Tanks (Active)	4097	42.456288	-82.998901
Dy-chem Products Co	Part 211, NREPA - Underground Storage Tanks (Active)	8663	42.456542	-83.005404
Mckinley Elementary	Part 211, NREPA - Underground Storage Tanks (Active)	40899	42.456647	-82.99135
Union Carbide Corp Linde Division	Part 211, NREPA - Underground Storage Tanks (Active)	3826	42.456689	-82.99731
Fayez Aliahmad	Part 211, NREPA - Underground Storage Tanks (Active)	12296	42.456745	-82.98648
Ring Screw Division	Part 211, NREPA - Underground Storage Tanks (Active)	21729	42.457427	-83.034844
Ali Ahmed Service	Part 211, NREPA - Underground Storage Tanks (Active)	7982	42.457558	-83.026345
B & M Auto Service Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	10476	42.457598	-82.90119
E. Detroit Public School	Part 211, NREPA - Underground Storage Tanks (Active)	50001207	42.457679	-82.951629
Merollis Chevrolet	Part 211, NREPA - Underground Storage Tanks (Active)	6775	42.457962	-82.962145
Merollis Chevrolet Sales & Service	Part 211, NREPA - Underground Storage Tanks (Active)	6776	42.458168	-82.962838
Cold Heading Co	Part 211, NREPA - Underground Storage Tanks (Active)	1757	42.458377	-83.005847
Commercial Site	Part 211, NREPA - Underground Storage Tanks (Active)	50002578	42.458444	-82.90134
GFL Environmental USA	Part 211, NREPA - Underground Storage Tanks (Active)	35031	42.458522	-83.009487
S & K Muffler	Part 211, NREPA - Underground Storage Tanks (Active)	40384	42.458635	-83.026443
Harding Elementary	Part 211, NREPA - Underground Storage Tanks (Active)	34702	42.458742	-83.029058
Merollis Chevrovet Sales & Service	Part 211, NREPA - Underground Storage Tanks (Active)	21483	42.458937	-82.962334
Mr Joseph Kraemer	Part 211, NREPA - Underground Storage Tanks (Active)	38894	42.459098	-82.901437
Kroger Store No D-495	Part 211, NREPA - Underground Storage Tanks (Active)	38532	42.459283	-82.882599
Ajax Bolt & Screw Division	Part 211, NREPA - Underground Storage Tanks (Active)	15095	42.459533	-83.01028
Belisle Auto & Truck Repair	Part 211, NREPA - Underground Storage Tanks (Active)	50000366	42.459583	-83.02647
7-11 Store	Part 211, NREPA - Underground Storage Tanks (Active)	21558	42.459789	-82.88208
Niagara LaSalle	Part 211, NREPA - Underground Storage Tanks (Active)	10918	42.459862	-83.000792
Best Block Co	Part 211, NREPA - Underground Storage Tanks (Active)	18063	42.459932	-82.995717
Shores Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	18289	42.460018	-82.900885
Square Deal Auto	Part 211, NREPA - Underground Storage Tanks (Active)	1765	42.460163	-82.959668
American Drive Train	Part 211, NREPA - Underground Storage Tanks (Active)	50000364	42.460841	-82.9942
Hofley Manufacturing Co	Part 211, NREPA - Underground Storage Tanks (Active)	42	42.460958	-82.993689
Ever Fresh Juice	Part 211, NREPA - Underground Storage Tanks (Active)	50001571	42.461193	-83.036551
Fast Track Ventures Acquistions, LLC Harper Clark	Part 211, NREPA - Underground Storage Tanks (Active)	12258	42.4617	-82.910133
Gratiot Site	Part 211, NREPA - Underground Storage Tanks (Active)	50005327	42.46177564	-82.9595312
East Detroit High School	Part 211, NREPA - Underground Storage Tanks (Active)	498	42.462109	-82.961674
E. Detroit Public School	Part 211, NREPA - Underground Storage Tanks (Active)	50001210	42.462349	-82.968532
Harper Lake Fuel	Part 211, NREPA - Underground Storage Tanks (Active)	13424	42.46235132	-82.90908703
Warren Fire Dept Headquarters	Part 211, NREPA - Underground Storage Tanks (Active)	18737	42.462383	-83.033418
Marathon Unit #1289	Part 211, NREPA - Underground Storage Tanks (Active)	13641	42.462567	-82.961741
Lincoln Sr. High School	Part 211, NREPA - Underground Storage Tanks (Active)	40895	42.462642	-83.021098
Faith Presbyterian Church	Part 211, NREPA - Underground Storage Tanks (Active)	6006	42.462661	-82.884207
Everfresh Juice Co	Part 211, NREPA - Underground Storage Tanks (Active)	6330	42.462753	-83.035
Ahmed Hijazi	Part 211, NREPA - Underground Storage Tanks (Active)	15700	42.462821	-83.032461
AL Fady LLC	Part 211, NREPA - Underground Storage Tanks (Active)	41737	42.46284504	-83.0346304
Ready Mix Concrete, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	18241	42.462972	-83.037003
Advance Motor	Part 211, NREPA - Underground Storage Tanks (Active)	38188	42.462977	-83.026346
Speedway #8871	Part 211, NREPA - Underground Storage Tanks (Active)	16345	42.462995	-83.005228
Dennis Lazeski	Part 211, NREPA - Underground Storage Tanks (Active)	3606	42.463188	-83.028935
Abro13 Property - 7225 Nine Mile Road LLC	Part 211, NREPA - Underground Storage Tanks (Active)	42529	42.46322	-83.03002
Razeen Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	39366	42.463237	-82.991979
Mr Mike St Pierre	Part 211, NREPA - Underground Storage Tanks (Active)	38367	42.463283	-83.006036
Warren Fire Station No. 1	Part 211, NREPA - Underground Storage Tanks (Active)	12526	42.463304	-83.022317
Condor Manufacturing Inc	Part 211, NREPA - Underground Storage Tanks (Active)	283	42.463345	-83.002766
Van Dyke Collision Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37861	42.463391	-83.015574
Warren Gas & Food Inc	Part 211, NREPA - Underground Storage Tanks (Active)	12322	42.463425	-83.032115
Serv. Bldg Van Dyke Pub Schol	Part 211, NREPA - Underground Storage Tanks (Active)	12898	42.463484	-83.009943
Midwest Paper Products	Part 211, NREPA - Underground Storage Tanks (Active)	35918	42.463512	-82.998224
Inalfa SSI off Systems	Part 211, NREPA - Underground Storage Tanks (Active)	21576	42.463551	-82.996879
Sam's Tire Center	Part 211, NREPA - Underground Storage Tanks (Active)	50002762	42.463627	-82.986123
Weyerhaeuser Paper Co	Part 211, NREPA - Underground Storage Tanks (Active)	2133	42.463636	-82.993794
Modern Hard Chrome	Part 211, NREPA - Underground Storage Tanks (Active)	16873	42.463641	-82.993422
Nine Mile Substation	Part 211, NREPA - Underground Storage Tanks (Active)	50005485	42.46369801	-83.00265053
Warren Fire Station No. 2	Part 211, NREPA - Underground Storage Tanks (Active)	12527	42.463701	-82.989188
9 & Hoover Property LLC	Part 211, NREPA - Underground Storage Tanks (Active)	14723	42.463708	-83.00621
Universal Ambulance Service	Part 211, NREPA - Underground Storage Tanks (Active)	50000431	42.46371	-82.988642
Bundy Tubing Corp	Part 211, NREPA - Underground Storage Tanks (Active)	15692	42.463756	-82.999216
St Clair Shores Main Post Office	Part 211, NREPA - Underground Storage Tanks (Active)	9837	42.463791	-82.899342
Acco Systems	Part 211, NREPA - Underground Storage Tanks (Active)	2821	42.463869	-82.995329
Vandyke Food Mart	Part 211, NREPA - Underground Storage Tanks (Active)	39910	42.463902	-83.026477

Site Name	Type	ID	Latitude	Longitude
Metro Radiator	Part 211, NREPA - Underground Storage Tanks (Active)	4849	42.463956	-82.885177
Bobs Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	10638	42.463977	-82.976073
Kmart #4177	Part 211, NREPA - Underground Storage Tanks (Active)	754	42.46408	-82.90909
7-Eleven #32375	Part 211, NREPA - Underground Storage Tanks (Active)	5382	42.464122	-82.986129
Warren Eastside Concrete LLC	Part 211, NREPA - Underground Storage Tanks (Active)	11380	42.464202	-82.992433
Sterling Auto Sales	Part 211, NREPA - Underground Storage Tanks (Active)	34729	42.464453	-82.956142
9 Mile & Hoover	Part 211, NREPA - Underground Storage Tanks (Active)	15096	42.464482	-83.000968
9 Mile I-94 Mobil - Repair Shop	Part 211, NREPA - Underground Storage Tanks (Active)	14364	42.464694	-82.948782
I S Real Estste LLC	Part 211, NREPA - Underground Storage Tanks (Active)	4440	42.46473312	-82.93904194
Eastpointe Police Station	Part 211, NREPA - Underground Storage Tanks (Active)	7015	42.464738	-82.957463
JSD Enterprise Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	5672	42.46476531	-82.9585416
Eastpointe Housing Commission	Part 211, NREPA - Underground Storage Tanks (Active)	33731	42.46482	-82.960408
Eastpointe Housing Commission	Part 211, NREPA - Underground Storage Tanks (Active)	33730	42.464826	-82.960506
John & Holger Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	334	42.464894	-82.951025
Bucks Sunoco Service Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10181	42.4649	-82.943838
Groesbeck Lumber Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37018	42.465013	-82.991073
Minit-lube #1268	Part 211, NREPA - Underground Storage Tanks (Active)	19958	42.465084	-82.927147
Former Gasoline Property	Part 211, NREPA - Underground Storage Tanks (Active)	50005822	42.46509437	-82.92978208
United Lighting Standards, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	36064	42.46512	-82.990991
Former Larrigo Nine Mile Service	Part 211, NREPA - Underground Storage Tanks (Active)	50005904	42.46513967	-82.92755245
Kroger #D-495	Part 211, NREPA - Underground Storage Tanks (Active)	10474	42.465237	-82.88609
Bank of America - Eastpointe M18-058	Part 211, NREPA - Underground Storage Tanks (Active)	50005906	42.46526256	-82.92293331
9 Mile Mobil	Part 211, NREPA - Underground Storage Tanks (Active)	16699	42.46527	-82.920235
Essex Specialty Products Inc	Part 211, NREPA - Underground Storage Tanks (Active)	14017	42.465286	-83.035714
Henkel Corp Parker + Amchem	Part 211, NREPA - Underground Storage Tanks (Active)	11584	42.46533	-83.035722
Former Metal Processing Plant	Part 211, NREPA - Underground Storage Tanks (Active)	50002764	42.465419	-82.949963
Mancini Construction, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	15809	42.465436	-82.986181
Amoco Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	21284	42.465436	-82.986181
Detroit Auto Sales	Part 211, NREPA - Underground Storage Tanks (Active)	4290	42.465567	-82.957142
EP Property LLC Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10722	42.46557	-82.93085
Auto Repair Facility	Part 211, NREPA - Underground Storage Tanks (Active)	50005476	42.46559283	-82.9897779
Chapaton East Retention Basin	Part 211, NREPA - Underground Storage Tanks (Active)	35936	42.465645	-82.885823
Nine & Harper Fuel Center	Part 211, NREPA - Underground Storage Tanks (Active)	3219	42.465683	-82.908632
Kens South Park Service	Part 211, NREPA - Underground Storage Tanks (Active)	7330	42.465816	-82.957834
Speedway #2317	Part 211, NREPA - Underground Storage Tanks (Active)	17464	42.46588647	-82.92228349
9 and Kelly Sunoco	Part 211, NREPA - Underground Storage Tanks (Active)	5955	42.465908	-82.926007
Express Fueling #1	Part 211, NREPA - Underground Storage Tanks (Active)	17855	42.46611178	-82.91680106
Nautical Mile Pitstop Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	5754	42.466208	-82.885575
Wemco	Part 211, NREPA - Underground Storage Tanks (Active)	35350	42.466211	-82.918962
High School	Part 211, NREPA - Underground Storage Tanks (Active)	37727	42.466211	-82.902955
Towing & Auto Service Facility	Part 211, NREPA - Underground Storage Tanks (Active)	50005477	42.46655173	-82.89429739
Roy Obrien Inc	Part 211, NREPA - Underground Storage Tanks (Active)	9115	42.466649	-82.897551
City Of St. Clair Shores	Part 211, NREPA - Underground Storage Tanks (Active)	21843	42.466663	-82.897131
Richards Automotive	Part 211, NREPA - Underground Storage Tanks (Active)	50005462	42.46673476	-82.90788205
Tri County Truck Repair	Part 211, NREPA - Underground Storage Tanks (Active)	50001603	42.466885	-82.988567
Judy J Sanders Trust	Part 211, NREPA - Underground Storage Tanks (Active)	50005424	42.46701459	-82.98889551
Nor-cote	Part 211, NREPA - Underground Storage Tanks (Active)	6383	42.467017	-83.009298
Little Elementary	Part 211, NREPA - Underground Storage Tanks (Active)	40897	42.467127	-83.018665
Tri-county Intl Trucks Inc	Part 211, NREPA - Underground Storage Tanks (Active)	301	42.467239	-82.988978
Metrd-detroit Sign, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	34124	42.46729	-83.00582
Richard & Trute Co	Part 211, NREPA - Underground Storage Tanks (Active)	50000567	42.467403	-83.006192
Harper Sunoco Inc	Part 211, NREPA - Underground Storage Tanks (Active)	21042	42.46742	-82.906545
Formsprag-warren	Part 211, NREPA - Underground Storage Tanks (Active)	37653	42.467529	-83.006188
South Lake Schools	Part 211, NREPA - Underground Storage Tanks (Active)	6854	42.467588	-82.897252
Former Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	42355	42.46766365	-82.90740463
The Cross Co	Part 211, NREPA - Underground Storage Tanks (Active)	14097	42.467757	-83.006185
H.s.a	Part 211, NREPA - Underground Storage Tanks (Active)	50002716	42.46789758	-82.91757412
Saad Yono	Part 211, NREPA - Underground Storage Tanks (Active)	50005342	42.46837502	-82.88705614
Julia Salis (island Harbor)	Part 211, NREPA - Underground Storage Tanks (Active)	2016	42.468505	-82.887581
Blue Star Inc	Part 211, NREPA - Underground Storage Tanks (Active)	42105	42.46930448	-82.99715328
Emerald City Harbor Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10165	42.469422	-82.887808
Angell-ricard	Part 211, NREPA - Underground Storage Tanks (Active)	9676	42.469629	-82.995928
St Clair Shores Builders Supply	Part 211, NREPA - Underground Storage Tanks (Active)	35280	42.46968	-82.907081
Ferris Property	Part 211, NREPA - Underground Storage Tanks (Active)	50001851	42.46983	-82.887737
Former Gas Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005391	42.46994558	-82.90596896
City Of Center Line	Part 211, NREPA - Underground Storage Tanks (Active)	6065	42.470022	-83.027389
Woodland Elementary	Part 211, NREPA - Underground Storage Tanks (Active)	50001208	42.470306	-82.943674
Heaven Enterprises Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	41008	42.4705	-83.005282
Little Mack Medical	Part 211, NREPA - Underground Storage Tanks (Active)	41851	42.470556	-82.907222
South Macomb Sanitary District	Part 211, NREPA - Underground Storage Tanks (Active)	9119	42.470562	-82.914121
Motor Pool	Part 211, NREPA - Underground Storage Tanks (Active)	18808	42.47057	-82.915622
Slim Petroleum LLC	Part 211, NREPA - Underground Storage Tanks (Active)	7945	42.470737	-82.985868
In N Out Enterprises	Part 211, NREPA - Underground Storage Tanks (Active)	21850	42.470815	-83.006264
Dougherty - Hanna Resources	Part 211, NREPA - Underground Storage Tanks (Active)	34218	42.470942	-82.989715
Stephens Transmission Station	Part 211, NREPA - Underground Storage Tanks (Active)	50005497	42.471111	-82.996667
City of Warren DPW	Part 211, NREPA - Underground Storage Tanks (Active)	18735	42.471208	-82.990829
Warren Water Garage	Part 211, NREPA - Underground Storage Tanks (Active)	3886	42.471208	-82.990803
Warren Water Division	Part 211, NREPA - Underground Storage Tanks (Active)	36151	42.471208	-82.990829
Michigan Rivet Corp	Part 211, NREPA - Underground Storage Tanks (Active)	4843	42.471213	-82.989943
Roosevelt El	Part 211, NREPA - Underground Storage Tanks (Active)	50000771	42.471389	-82.979147
Blakely Products Co	Part 211, NREPA - Underground Storage Tanks (Active)	19276	42.471402	-82.983734
Michigan Harbor Properties LLC	Part 211, NREPA - Underground Storage Tanks (Active)	16507	42.471443	-82.881192
Nine Mile Convenience Inc	Part 211, NREPA - Underground Storage Tanks (Active)	41721	42.47147083	-82.95260855
Jefferson Beach Marina	Part 211, NREPA - Underground Storage Tanks (Active)	18192	42.471536	-82.888554
Speedway #2292	Part 211, NREPA - Underground Storage Tanks (Active)	17480	42.471777	-82.95388
Meyers Brothers Automotive Inc	Part 211, NREPA - Underground Storage Tanks (Active)	36597	42.471864	-82.985504
Ed Rinke Buick	Part 211, NREPA - Underground Storage Tanks (Active)	4611	42.472249	-83.027689
Colonial Dodge Inc	Part 211, NREPA - Underground Storage Tanks (Active)	40646	42.472331	-82.952715
Colonial Dodge Inc	Part 211, NREPA - Underground Storage Tanks (Active)	11412	42.472447	-82.953495
Keener Tool & Engineering	Part 211, NREPA - Underground Storage Tanks (Active)	1829	42.472489	-82.942228
S & k Muffler (Former)	Part 211, NREPA - Underground Storage Tanks (Active)	50005681	42.47252157	-82.88943124
Mahon Door Corp	Part 211, NREPA - Underground Storage Tanks (Active)	50002291	42.472637	-83.003041
Soulliere Landscaping Center	Part 211, NREPA - Underground Storage Tanks (Active)	9843	42.472683	-82.907131
Miller Marina Inc	Part 211, NREPA - Underground Storage Tanks (Active)	18291	42.472758	-82.882029
Uhaul 754-76 (mack & Harper Ctr)	Part 211, NREPA - Underground Storage Tanks (Active)	15335	42.472861	-82.907142
#4111 United Oil Corp Tulsa	Part 211, NREPA - Underground Storage Tanks (Active)	11832	42.472943	-82.889254
Ruggeri Electrical Contracting C	Part 211, NREPA - Underground Storage Tanks (Active)	17919	42.473234	-82.911319
Taylor Roofing & Maint., Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10697	42.473262	-82.910356
Motor City Tobacco & Candy Co	Part 211, NREPA - Underground Storage Tanks (Active)	853	42.473363	-82.906792
Miller Dryland	Part 211, NREPA - Underground Storage Tanks (Active)	39766	42.47381	-82.885725
Erb Lumber Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10850	42.475413	-82.986594
Tamaroff Acura	Part 211, NREPA - Underground Storage Tanks (Active)	15038	42.475552	-82.950566
Jerry Lynch Inc	Part 211, NREPA - Underground Storage Tanks (Active)	36832	42.475724	-82.951351
Kennedy Park Swimming Pool	Part 211, NREPA - Underground Storage Tanks (Active)	194	42.475995	-82.937329
Atsalis Brothers Painting Co	Part 211, NREPA - Underground Storage Tanks (Active)	10123	42.476195	-82.982799
J, S & S Lubricants Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	1404	42.476578	-82.950693
Van - 10 LLC	Part 211, NREPA - Underground Storage Tanks (Active)	15087	42.47664213	-83.02671262
Bavarian Motor Village Ltd	Part 211, NREPA - Underground Storage Tanks (Active)	35130	42.47709	-82.950457

Site Name	Type	ID	Latitude	Longitude
I S Real Estate LLC	Part 211, NREPA - Underground Storage Tanks (Active)	16695	42.47719	-83.027732
Millers Service	Part 211, NREPA - Underground Storage Tanks (Active)	8371	42.477388	-82.949352
DHIA LLC	Part 211, NREPA - Underground Storage Tanks (Active)	4922	42.47742	-83.00635
Marathon Gas	Part 211, NREPA - Underground Storage Tanks (Active)	33169	42.477597	-83.026547
Jet	Part 211, NREPA - Underground Storage Tanks (Active)	7365	42.477612	-83.010838
FTV-11650 E 10 Mile	Part 211, NREPA - Underground Storage Tanks (Active)	18154	42.477667	-83.005496
Chas F Irish Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	9732	42.47774	-82.981143
Neuners Service Center Inc	Part 211, NREPA - Underground Storage Tanks (Active)	3766	42.477774	-83.022754
U-haul 754-78	Part 211, NREPA - Underground Storage Tanks (Active)	15333	42.477865	-82.981471
Frescuras Service	Part 211, NREPA - Underground Storage Tanks (Active)	35993	42.477938	-83.005944
Widger Chemical Corp	Part 211, NREPA - Underground Storage Tanks (Active)	7014	42.47818	-82.986173
Fayez Investment LLC	Part 211, NREPA - Underground Storage Tanks (Active)	1594	42.478182	-82.987423
A & D Radiator	Part 211, NREPA - Underground Storage Tanks (Active)	50005426	42.47819506	-82.9816817
10 & Hoover Fuel LLC	Part 211, NREPA - Underground Storage Tanks (Active)	19223	42.47822	-83.006398
Degrandis Rentals	Part 211, NREPA - Underground Storage Tanks (Active)	41229	42.47834881	-82.9820397
Ed & Toms Service	Part 211, NREPA - Underground Storage Tanks (Active)	36479	42.478409	-82.980611
Capri Investment Co	Part 211, NREPA - Underground Storage Tanks (Active)	16797	42.47843	-82.982092
Precision Tune	Part 211, NREPA - Underground Storage Tanks (Active)	37198	42.478471	-82.986713
1365	Part 211, NREPA - Underground Storage Tanks (Active)	34507	42.478559	-82.980921
Super Car Wash Express Inc	Part 211, NREPA - Underground Storage Tanks (Active)	1503	42.478562	-82.986717
7-Eleven #32618	Part 211, NREPA - Underground Storage Tanks (Active)	39783	42.478858	-82.980691
Gastmeiers Service Inc	Part 211, NREPA - Underground Storage Tanks (Active)	8677	42.478949	-82.980199
G L Seibert Co	Part 211, NREPA - Underground Storage Tanks (Active)	16796	42.4791	-82.975613
City of Easpointe DPW	Part 211, NREPA - Underground Storage Tanks (Active)	7174	42.479378	-82.938408
Sams Auto Repair	Part 211, NREPA - Underground Storage Tanks (Active)	13631	42.479718	-82.939516
Water/sewer Sewer Dept	Part 211, NREPA - Underground Storage Tanks (Active)	38091	42.479724	-82.93923
10 Mile & Kelly Inc	Part 211, NREPA - Underground Storage Tanks (Active)	16712	42.47975886	-82.92654284
Marathon Unit #1713	Part 211, NREPA - Underground Storage Tanks (Active)	13632	42.479833	-82.956874
10 Mile & I-94 Petro-Mart Inc	Part 211, NREPA - Underground Storage Tanks (Active)	5743	42.47986078	-82.91736969
10 Mile and Gratiot Sunoco Inc	Part 211, NREPA - Underground Storage Tanks (Active)	5961	42.479893	-82.94756
Speedway #6201	Part 211, NREPA - Underground Storage Tanks (Active)	11877	42.479978	-82.965612
Adams Rib	Part 211, NREPA - Underground Storage Tanks (Active)	13797	42.479981	-82.906967
Midwest Convention Center	Part 211, NREPA - Underground Storage Tanks (Active)	11953	42.480086	-82.934848
Variety Vendors	Part 211, NREPA - Underground Storage Tanks (Active)	34145	42.480103	-83.006576
Henry Ford Macomb Hospital - Warren	Part 211, NREPA - Underground Storage Tanks (Active)	36944	42.480108	-82.989065
Harbor Auto Service	Part 211, NREPA - Underground Storage Tanks (Active)	16803	42.48023	-82.889622
Sunoco Duns #0008-3352	Part 211, NREPA - Underground Storage Tanks (Active)	5980	42.48025	-82.926729
Plymouth Petro LLC	Part 211, NREPA - Underground Storage Tanks (Active)	5827	42.480387	-82.967688
Shell	Part 211, NREPA - Underground Storage Tanks (Active)	10475	42.480435	-82.90614167
Amoco Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	21285	42.480497	-82.901933
Shell Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	37798	42.480708	-82.918142
Eftec North America	Part 211, NREPA - Underground Storage Tanks (Active)	7013	42.480809	-82.984401
Speedway #8854	Part 211, NREPA - Underground Storage Tanks (Active)	16351	42.48089667	-82.907815
Michigan Bell Telephone Co / D/B/A SBC Michigan (M19548)	Part 211, NREPA - Underground Storage Tanks (Active)	11611	42.480902	-82.93615
IBB Properties Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	16702	42.48144833	-82.90677
Shores Landscaping & Garden Ctr	Part 211, NREPA - Underground Storage Tanks (Active)	36719	42.481653	-82.907398
Cadillac Gage Textron	Part 211, NREPA - Underground Storage Tanks (Active)	50000363	42.483068	-82.977103
Tri-city Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	21879	42.48327	-82.945483
Sisters/bon Secours Nursing Ctr	Part 211, NREPA - Underground Storage Tanks (Active)	38623	42.483277	-82.889594
City Of Warren Sanitation Div	Part 211, NREPA - Underground Storage Tanks (Active)	5861	42.483407	-82.981077
Lawn Senior Citizens Building	Part 211, NREPA - Underground Storage Tanks (Active)	37800	42.483786	-82.940166
Roseville Car Wash	Part 211, NREPA - Underground Storage Tanks (Active)	10734	42.484197	-82.944869
Martin Retention Basin	Part 211, NREPA - Underground Storage Tanks (Active)	35935	42.484903	-82.890833
Roseville Chrysler-Plymouth Inc	Part 211, NREPA - Underground Storage Tanks (Active)	13422	42.48552	-82.94307
Hoover eleven Shopping Center	Part 211, NREPA - Underground Storage Tanks (Active)	41492	42.48575068	-83.00657568
Clark Transmissions Inc	Part 211, NREPA - Underground Storage Tanks (Active)	17868	42.486166	-82.975208
Eastside Petro Minimart LLC	Part 211, NREPA - Underground Storage Tanks (Active)	38323	42.48629833	-82.89839
James Mctevia	Part 211, NREPA - Underground Storage Tanks (Active)	50000428	42.4863	-82.97801
Roseville Fire Department	Part 211, NREPA - Underground Storage Tanks (Active)	7133	42.487038	-82.94176
Bon Heur Pump Station	Part 211, NREPA - Underground Storage Tanks (Active)	34691	42.487044	-82.898588
Quaker State Minit Lube #1038	Part 211, NREPA - Underground Storage Tanks (Active)	10352	42.487084	-82.943914
Quick & Clean Car Wash	Part 211, NREPA - Underground Storage Tanks (Active)	38927	42.487413	-82.943701
Maiwald Car Repair	Part 211, NREPA - Underground Storage Tanks (Active)	38926	42.487482	-82.943656
Prince Macoroni Co Inc	Part 211, NREPA - Underground Storage Tanks (Active)	10457	42.487634	-82.974106
Kroger 663	Part 211, NREPA - Underground Storage Tanks (Active)	20849	42.488175	-82.94179333
Midwest Brake Bond Co	Part 211, NREPA - Underground Storage Tanks (Active)	35666	42.488298	-82.973608
M-97 Auto Dealer	Part 211, NREPA - Underground Storage Tanks (Active)	19203	42.488602	-82.973377
Romaya's Marathon Inc	Part 211, NREPA - Underground Storage Tanks (Active)	41318	42.48891667	-82.94273833
Valley Auto Parts Inc (dba) Hermiz Auto Parts	Part 211, NREPA - Underground Storage Tanks (Active)	4521	42.488956	-82.977121
Central Fire	Part 211, NREPA - Underground Storage Tanks (Active)	18810	42.48966	-82.89741
American Bakeries Co	Part 211, NREPA - Underground Storage Tanks (Active)	1906	42.490683	-82.987139
Roadway Express, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	16981	42.491272	-82.977713
New Detroit Donut Management LLC	Part 211, NREPA - Underground Storage Tanks (Active)	40708	42.491336	-83.006106
Shock Brothers Inc	Part 211, NREPA - Underground Storage Tanks (Active)	40722	42.49143	-82.977218
Dicicco Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	20047	42.491448	-83.00629
Michigan Fuels Retail #731654	Part 211, NREPA - Underground Storage Tanks (Active)	3222	42.491512	-83.007277
Macomb County Locksmith	Part 211, NREPA - Underground Storage Tanks (Active)	36029	42.492327	-82.940481
F&R Fuel Mart	Part 211, NREPA - Underground Storage Tanks (Active)	12313	42.492875	-82.940335
Metro Tire Center	Part 211, NREPA - Underground Storage Tanks (Active)	21743	42.492884	-82.940119
Precision Tune	Part 211, NREPA - Underground Storage Tanks (Active)	35646	42.493248	-82.897342
Fayer Investment LLC	Part 211, NREPA - Underground Storage Tanks (Active)	33434	42.493304	-82.987575
696 & Gratiot Mobil Inc	Part 211, NREPA - Underground Storage Tanks (Active)	19046	42.493707	-82.939445
20th Century Auto Sales Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37928	42.493824	-82.938505
Lakeview Public Schools	Part 211, NREPA - Underground Storage Tanks (Active)	189	42.494273	-82.907313
Warren Woods Tower High School	Part 211, NREPA - Underground Storage Tanks (Active)	6924	42.494704	-82.977344
Roseville Community Schools	Part 211, NREPA - Underground Storage Tanks (Active)	12464	42.49489	-82.934504
Former Gasoline Suc Station	Part 211, NREPA - Underground Storage Tanks (Active)	50001850	42.495091	-82.897465
Sunoco 0008-4236	Part 211, NREPA - Underground Storage Tanks (Active)	19875	42.495158	-82.907671
Little Mack Investors Inc	Part 211, NREPA - Underground Storage Tanks (Active)	8679	42.495218	-82.90809
N & B Enterprises Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4902	42.495337	-82.937293
Instant Oil Co	Part 211, NREPA - Underground Storage Tanks (Active)	50000541	42.495339	-82.897855
Costco Gasoline (Loc. No. 394)	Part 211, NREPA - Underground Storage Tanks (Active)	39709	42.49572333	-82.93670833
City Of St Clair Shores	Part 211, NREPA - Underground Storage Tanks (Active)	50000433	42.49605282	-82.88863464
Shell Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	10472	42.496201	-82.898117
Arbor Drugs	Part 211, NREPA - Underground Storage Tanks (Active)	50000002	42.496228	-82.89736
St Clair Shores Police Station	Part 211, NREPA - Underground Storage Tanks (Active)	38374	42.496457	-82.889032
Koch Automotive Products Co	Part 211, NREPA - Underground Storage Tanks (Active)	19399	42.49657	-82.972138
Roseville CO (M19530)	Part 211, NREPA - Underground Storage Tanks (Active)	11763	42.49660833	-82.936075
Omega Petro Inc	Part 211, NREPA - Underground Storage Tanks (Active)	7359	42.496678	-82.967597
Ryder Transportation Serv #0274	Part 211, NREPA - Underground Storage Tanks (Active)	8060	42.49753667	-82.96751667
Roseville Warehouse	Part 211, NREPA - Underground Storage Tanks (Active)	41388	42.49895399	-82.96496019
Advantage Packaging Inc	Part 211, NREPA - Underground Storage Tanks (Active)	37443	42.499613	-82.965096
Four Seasons Auto Wash	Part 211, NREPA - Underground Storage Tanks (Active)	15427	42.500181	-82.897511
Capitani Property	Part 211, NREPA - Underground Storage Tanks (Active)	50001606	42.500886	-82.963697
Burns Automatic	Part 211, NREPA - Underground Storage Tanks (Active)	2635	42.50109	-82.963968
27990 Groesbeck LLC	Part 211, NREPA - Underground Storage Tanks (Active)	37804	42.501335	-82.963063
Michigan Cartage	Part 211, NREPA - Underground Storage Tanks (Active)	9177	42.501579	-82.967183
Hot & Now	Part 211, NREPA - Underground Storage Tanks (Active)	42068	42.501919	-82.93408

Site Name	Type	ID	Latitude	Longitude
Amoco Oil Station #5374	Part 211, NREPA - Underground Storage Tanks (Active)	21245	42.502174	-82.933926
1327	Part 211, NREPA - Underground Storage Tanks (Active)	18518	42.50246167	-82.93402167
Wolverine Bronze Co	Part 211, NREPA - Underground Storage Tanks (Active)	20906	42.502655	-82.968002
Former Gas Station /TuffyMuffler	Part 211, NREPA - Underground Storage Tanks (Active)	50005571	42.502778	-82.8975
Party Store	Part 211, NREPA - Underground Storage Tanks (Active)	13604	42.502808	-82.907951
Taco Bell	Part 211, NREPA - Underground Storage Tanks (Active)	37524	42.502895	-82.898208
Lanzo Construction	Part 211, NREPA - Underground Storage Tanks (Active)	50005147	42.502923	-82.962123
Little Mack Marathon	Part 211, NREPA - Underground Storage Tanks (Active)	10500	42.503018	-82.907563
Aero Grinding Inc	Part 211, NREPA - Underground Storage Tanks (Active)	36897	42.503289	-82.961847
Sunoco #0008-3468	Part 211, NREPA - Underground Storage Tanks (Active)	50002749	42.50384137	-82.93196994
Roseville Gas	Part 211, NREPA - Underground Storage Tanks (Active)	10488	42.503995	-82.93321667
Tia Shell Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	16940	42.50585167	-82.89866333
Speedway #5495	Part 211, NREPA - Underground Storage Tanks (Active)	3073	42.50608667	-82.93049667
Uncle Ed's Oil Shoppes	Part 211, NREPA - Underground Storage Tanks (Active)	16519	42.506291	-82.898051
FDP Jefferson LLC	Part 211, NREPA - Underground Storage Tanks (Active)	17609	42.507117	-82.881863
Sparks Tune-up	Part 211, NREPA - Underground Storage Tanks (Active)	50000344	42.507448	-82.92949
Ayar Property Mgt Corp	Part 211, NREPA - Underground Storage Tanks (Active)	40597	42.507723	-82.881547
Minit-lube (1403)/former	Part 211, NREPA - Underground Storage Tanks (Active)	13010	42.509695	-82.908326
12 Mile & Gratiot Service Center Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	16700	42.50970833	-82.927895
12 Mile & Gratiot Short Stop	Part 211, NREPA - Underground Storage Tanks (Active)	20814	42.510042	-82.928877
Speedway #8838	Part 211, NREPA - Underground Storage Tanks (Active)	16342	42.510175	-82.935915
Standard Federal Bank	Part 211, NREPA - Underground Storage Tanks (Active)	40560	42.510475	-82.908811
A & J Fuel Mart Inc	Part 211, NREPA - Underground Storage Tanks (Active)	18146	42.510487	-82.916817
Midas Muffler	Part 211, NREPA - Underground Storage Tanks (Active)	21845	42.510628	-82.898675
Arnold Automotive	Part 211, NREPA - Underground Storage Tanks (Active)	5134	42.51084	-82.927058
12 Mile & Little Mack Mobil	Part 211, NREPA - Underground Storage Tanks (Active)	16743	42.510867	-82.907998
HY & Y Inc	Part 211, NREPA - Underground Storage Tanks (Active)	12357	42.51096833	-82.897715
Rockys Auto Sales	Part 211, NREPA - Underground Storage Tanks (Active)	33398	42.511957	-82.926173
Roseville Electric, Inc	Part 211, NREPA - Underground Storage Tanks (Active)	4595	42.513207	-82.926665
Rosevile Housing Commission	Part 211, NREPA - Underground Storage Tanks (Active)	37791	42.513244	-82.931983
Bethlehem Lutheran Church & Sch	Part 211, NREPA - Underground Storage Tanks (Active)	15638	42.515472	-82.925217
Redline Automotive	Part 211, NREPA - Underground Storage Tanks (Active)	35530	42.51548	-82.898868
Modern Mirror & Glass Co	Part 211, NREPA - Underground Storage Tanks (Active)	19519	42.515498	-82.906885
Police Station	Part 211, NREPA - Underground Storage Tanks (Active)	7487	42.515798	-82.92501
City Of Roseville	Part 211, NREPA - Underground Storage Tanks (Active)	50001649	42.515807	-82.925003
Kent-moore Spx Operation	Part 211, NREPA - Underground Storage Tanks (Active)	33064	42.516188	-82.908588
Salvatore & Sons Inc	Part 211, NREPA - Underground Storage Tanks (Active)	12460	42.516355	-82.907918
Roseville Fire Department	Part 211, NREPA - Underground Storage Tanks (Active)	7134	42.516957	-82.929114
Olsen's Service	Part 211, NREPA - Underground Storage Tanks (Active)	5370	42.517119	-82.924167
City Of Roseville	Part 211, NREPA - Underground Storage Tanks (Active)	50001149	42.51725477	-82.92846327
Clancy Excavating Co	Part 211, NREPA - Underground Storage Tanks (Active)	14516	42.517273	-82.908635
Clancy Excavating Co	Part 211, NREPA - Underground Storage Tanks (Active)	18487	42.517496	-82.908643
Pro Golf/discount Inc	Part 211, NREPA - Underground Storage Tanks (Active)	38677	42.51766	-82.922861
Former MEGA Precast/Former National Precast	Part 211, NREPA - Underground Storage Tanks (Active)	7665	42.518425	-82.90651167
Cochran Drain Tile Co	Part 211, NREPA - Underground Storage Tanks (Active)	6487	42.5187	-82.908693
Roseville Post Office	Part 211, NREPA - Underground Storage Tanks (Active)	2156	42.521438	-82.920417
Violet Pump Station	Part 211, NREPA - Underground Storage Tanks (Active)	35937	42.52166	-82.889089
Harper Fuel Mart Inc.	Part 211, NREPA - Underground Storage Tanks (Active)	3961	42.521897	-82.897998
Jeffrey Automotive Group	Part 211, NREPA - Underground Storage Tanks (Active)	5843	42.52337667	-82.91797
Lake Shore High	Part 211, NREPA - Underground Storage Tanks (Active)	50000340	42.523537	-82.882457
Goodyear Tire Center	Part 211, NREPA - Underground Storage Tanks (Active)	21774	42.523607	-82.898394
Union 76	Part 211, NREPA - Underground Storage Tanks (Active)	50001564	42.523768	-82.920513
Meijer Store #63	Part 211, NREPA - Underground Storage Tanks (Active)	33024	42.524257	-82.908492
Mccullough Leasing	Part 211, NREPA - Underground Storage Tanks (Active)	21730	42.524547	-82.910117
North End Fire	Part 211, NREPA - Underground Storage Tanks (Active)	18811	42.524976	-82.889223
Kmart #3262	Part 211, NREPA - Underground Storage Tanks (Active)	801	42.525015	-82.905672
Kroger D-074	Part 211, NREPA - Underground Storage Tanks (Active)	19042	42.52533	-82.909227
Speedway #8839	Part 211, NREPA - Underground Storage Tanks (Active)	16420	42.525598	-82.908508
13 & Harper LLC	Part 211, NREPA - Underground Storage Tanks (Active)	16855	42.52585	-82.89723167
32309 Jefferson Property LLC	Part 211, NREPA - Underground Storage Tanks (Active)	19204	42.527127	-82.874578
Shadowoods Auto Center Inc	Part 211, NREPA - Underground Storage Tanks (Active)	6016	42.527427	-82.91759
John Ryan	Part 211, NREPA - Underground Storage Tanks (Active)	21565	42.527735	-82.892238
Midas Realty Corp	Part 211, NREPA - Underground Storage Tanks (Active)	21815	42.528659	-82.916608
Former Roseville School	Part 211, NREPA - Underground Storage Tanks (Active)	39119	42.52871	-82.915658
U-haul	Part 211, NREPA - Underground Storage Tanks (Active)	15340	42.528859	-82.915562
Sam's Club #6662	Part 211, NREPA - Underground Storage Tanks (Active)	41295	42.52914833	-82.91437667
Samad Enterprises Inc	Part 211, NREPA - Underground Storage Tanks (Active)	17518	42.529187	-82.909715
Pizza Hut	Part 211, NREPA - Underground Storage Tanks (Active)	50005448	42.52942132	-82.91660293
Consumer Tire Corp	Part 211, NREPA - Underground Storage Tanks (Active)	36708	42.52986	-82.91492
Marathon Unit #1862	Part 211, NREPA - Underground Storage Tanks (Active)	13794	42.531772	-82.929033
MS Fuels 1	Part 211, NREPA - Underground Storage Tanks (Active)	21325	42.532513	-82.913073
Mobil of Roseville	Part 211, NREPA - Underground Storage Tanks (Active)	39877	42.532539	-82.910058
St Clair Shores Country Club	Part 211, NREPA - Underground Storage Tanks (Active)	33469	42.532587	-82.892411
Ram Fuel LLC	Part 211, NREPA - Underground Storage Tanks (Active)	10473	42.532797	-82.887485
Sears Roebuck & Co Store #1450	Part 211, NREPA - Underground Storage Tanks (Active)	13897	42.533134	-82.913686
Lees Service	Part 211, NREPA - Underground Storage Tanks (Active)	50001961	42.534433	-82.868193
The Brake Shop	Part 211, NREPA - Underground Storage Tanks (Active)	33063	42.534639	-82.91182
Mccausey Lumber Co	Part 211, NREPA - Underground Storage Tanks (Active)	8426	42.535289	-82.909895
Firestone Store #2525/006149	Part 211, NREPA - Underground Storage Tanks (Active)	8364	42.536109	-82.911755
General Tire Servic	Part 211, NREPA - Underground Storage Tanks (Active)	15539	42.537585	-82.909895
Construction Management Inc	Part 211, NREPA - Underground Storage Tanks (Active)	7882	42.537914	-82.885038
Gratiot Gas & Food Mart	Part 211, NREPA - Underground Storage Tanks (Active)	2258	42.539213	-82.909897
Sav Air Products Co	Part 211, NREPA - Underground Storage Tanks (Active)	38012	42.539498	-82.885936
Marsack Sand & Gravel Inc	Part 211, NREPA - Underground Storage Tanks (Active)	3628	42.539605	-82.906839
Hebrew Memorial Park	Part 211, NREPA - Underground Storage Tanks (Active)	17100	42.540028	-82.899243
Atsalis Bros Painting Co	Part 211, NREPA - Underground Storage Tanks (Active)	42350	42.54032	-82.89119
Former Speedy Muffler Shop	Part 211, NREPA - Underground Storage Tanks (Active)	50002637	42.540555	-82.907979
Mount Clemens Site No. 7	Part 211, NREPA - Underground Storage Tanks (Active)	12564	42.541771	-82.889956
Uncle Ed's Oil Shoppe	Part 211, NREPA - Underground Storage Tanks (Active)	16104	42.54211	-82.908165
United Truck Sales	Part 211, NREPA - Underground Storage Tanks (Active)	36769	42.542512	-82.885
Elks Club	Part 211, NREPA - Underground Storage Tanks (Active)	36421	42.544448	-82.904217
Fisca Station No 0-002906	Part 211, NREPA - Underground Storage Tanks (Active)	2906	42.545773	-82.904456
Star Oil LLC	Part 211, NREPA - Underground Storage Tanks (Active)	16347	42.545955	-82.90383
Pankow Career Center	Part 211, NREPA - Underground Storage Tanks (Active)	50000435	42.54622196	-82.85628749
Middle School South	Part 211, NREPA - Underground Storage Tanks (Active)	50000442	42.54624	-82.856984
Uni-Dig Inc	Part 211, NREPA - Underground Storage Tanks (Active)	3725	42.54689455	-82.8991414
Johns Lumber	Part 211, NREPA - Underground Storage Tanks (Active)	35852	42.548174	-82.903735
Roseville North CO (M19541)	Part 211, NREPA - Underground Storage Tanks (Active)	11762	42.548247	-82.902365
Eddys Auto Repair	Part 211, NREPA - Underground Storage Tanks (Active)	1505	42.548653	-82.854863
Vacant Building	Part 211, NREPA - Underground Storage Tanks (Active)	50005182	42.54948512	-82.90305686
Yacks Elementary School	Part 211, NREPA - Underground Storage Tanks (Active)	50000441	42.54953	-82.86467
Shell Harper	Part 211, NREPA - Underground Storage Tanks (Active)	38975	42.550038	-82.873607
Datta Enterprises Inc	Part 211, NREPA - Underground Storage Tanks (Active)	19194	42.55051979	-82.90095098
Bill Lee Oldsmobile Inc	Part 211, NREPA - Underground Storage Tanks (Active)	1796	42.55066	-82.903272
Clinton Township Service Center	Part 211, NREPA - Underground Storage Tanks (Active)	21818	42.551852	-82.879325
Clinton Twp Police Dept.	Part 211, NREPA - Underground Storage Tanks (Active)	7022	42.551867	-82.882297
Cf Motorfreight	Part 211, NREPA - Underground Storage Tanks (Active)	34884	42.552173	-82.883907
Nothdurft Tool & Manufacturing	Part 211, NREPA - Underground Storage Tanks (Active)	34866	42.55306	-82.882453

Site Name	Type	ID	Latitude	Longitude
Best Tool Engineering	Part 211, NREPA - Underground Storage Tanks (Active)	39197	42.553469	-82.880659
Smart - Macomb Terminal	Part 211, NREPA - Underground Storage Tanks (Active)	17224	42.553777	-82.883353
Marathon Unit #2762	Part 211, NREPA - Underground Storage Tanks (Active)	13649	42.554264	-82.910599
Clinton Twnshp Fire Dept.	Part 211, NREPA - Underground Storage Tanks (Active)	18721	42.55444	-82.903572
Leonard C Carnaghi Inc	Part 211, NREPA - Underground Storage Tanks (Active)	36930	42.554683	-82.866595
1341	Part 211, NREPA - Underground Storage Tanks (Active)	19873	42.55486	-82.87079
Little Mack Market & 15 Mile Rd.	Part 211, NREPA - Underground Storage Tanks (Active)	19916	42.55486608	-82.90996679
Gas & Go Station LLC	Part 211, NREPA - Underground Storage Tanks (Active)	36547	42.555048	-82.898622
Stan & Mikes Auto Service	Part 211, NREPA - Underground Storage Tanks (Active)	15650	42.555175	-82.870098
Harrison Township Citgo	Part 211, NREPA - Underground Storage Tanks (Active)	12282	42.555338	-82.852595
Clintondale Community Schools	Part 211, NREPA - Underground Storage Tanks (Active)	6835	42.555488	-82.907783
Tower Petroleum Corp	Part 211, NREPA - Underground Storage Tanks (Active)	39414	42.555638	-82.870517
Mobil	Part 211, NREPA - Underground Storage Tanks (Active)	50000504	42.555788	-82.86997
Charter Twp of Clinton Water Dept	Part 211, NREPA - Underground Storage Tanks (Active)	16858	42.556272	-82.868118
Montgomery Ward-regional Shoppin	Part 211, NREPA - Underground Storage Tanks (Active)	20905	42.556332	-82.899172
SA Management Inc	Part 211, NREPA - Underground Storage Tanks (Active)	11882	42.557108	-82.869685
Commercial Building	Part 211, NREPA - Underground Storage Tanks (Active)	50005205	42.557899	-82.870219
Speedy Q Markets #345	Part 211, NREPA - Underground Storage Tanks (Active)	5227	42.559502	-82.869417
Kks Party Shoppe	Part 211, NREPA - Underground Storage Tanks (Active)	37141	42.560713	-82.848399
Mike Dorian Ford Inc	Part 211, NREPA - Underground Storage Tanks (Active)	15351	42.561656	-82.895421
Admiral Marina	Part 211, NREPA - Underground Storage Tanks (Active)	18921	42.562729	-82.846184
Hide Away Harbor Marina Inc	Part 211, NREPA - Underground Storage Tanks (Active)	14966	42.56334722	-82.84169384
Wilfred Lowe Property	Part 211, NREPA - Underground Storage Tanks (Active)	38319	42.564345	-82.844889
36315 Express Inc	Part 211, NREPA - Underground Storage Tanks (Active)	18312	42.56461322	-82.89507517
Shell Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	10487	42.565172	-82.893571
Speedway #2332	Part 211, NREPA - Underground Storage Tanks (Active)	17552	42.566313	-82.842907
St John North Shore Hospital	Part 211, NREPA - Underground Storage Tanks (Active)	7328	42.566347	-82.849247
Blue Sky Mobile Vlg/new Appearan	Part 211, NREPA - Underground Storage Tanks (Active)	37598	42.566512	-82.841978
Charter Township of Harrison	Part 211, NREPA - Underground Storage Tanks (Active)	7838	42.5679177	-82.84336218
Pegelo Service Station	Part 211, NREPA - Underground Storage Tanks (Active)	15010	42.568667	-82.84014
Toma Capital LLC	Part 211, NREPA - Underground Storage Tanks (Active)	4939	42.568932	-82.892952
Platinum Petroleum Inc	Part 211, NREPA - Underground Storage Tanks (Active)	5841	42.56900668	-82.87138053
Luigis Rest & Lounge	Part 211, NREPA - Underground Storage Tanks (Active)	1400	42.569022	-82.839729
Lanse Creuse Admin Bldg	Part 211, NREPA - Underground Storage Tanks (Active)	50000436	42.569401	-82.839191
Zunairah Fuels Inc	Part 211, NREPA - Underground Storage Tanks (Active)	18181	42.57014394	-82.87211009
Jefferson Motor Service	Part 211, NREPA - Underground Storage Tanks (Active)	16042	42.571323	-82.834983
Mobil SS #03-C5T	Part 211, NREPA - Underground Storage Tanks (Active)	3226	42.5717479	-82.87182041
Jimmys Boat Livery	Part 211, NREPA - Underground Storage Tanks (Active)	928	42.573266	-82.821045
Neil Reid School	Part 211, NREPA - Underground Storage Tanks (Active)	150	42.575422	-82.871165
Metro Beach Metropark	Part 211, NREPA - Underground Storage Tanks (Active)	14925	42.580138	-82.799523
Metro Beach Fuel Valero	Part 211, NREPA - Underground Storage Tanks (Active)	41869	42.58269668	-82.81056412
Lanse Creuse High School Cntrl	Part 211, NREPA - Underground Storage Tanks (Active)	50000437	42.583678	-82.854531
South River Marina	Part 211, NREPA - Underground Storage Tanks (Active)	14971	42.593737	-82.791849
Jefferson Assembly Plant	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16152	42.369298	-82.962073
Golightly Voc/tech Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5457	42.369736	-82.952138
Jefferson/conners Project	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001551	42.369818	-82.959022
A & J Fuel LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10482	42.369886	-82.959529
North Chrysler Plant	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001552	42.370763	-82.969675
Comerica Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37271	42.370858	-82.949637
Vacant Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38574	42.371557	-82.948547
Fire Dept Engine #38	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19111	42.371625	-82.950189
Sunoco 008-3287	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5950	42.37263	-82.945802
Standard Car Wash Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17990	42.374022	-82.942246
Vito Tigaudo	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36577	42.374314	-82.941519
Mobile	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38758	42.374531	-82.940163
Jefferson Express Marathon	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10494	42.374815	-82.939449
Eastside Transition Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38971	42.374836	-82.947175
New Chrysler Plant	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000236	42.37555517	-82.97228095
Nrt Owner	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005157	42.375563	-82.938379
City of Grosse Pointe Park	Part 213, NREPA - Leaking Underground Storage Tank System Releases	143	42.375941	-82.937669
Hammond Chevrolet Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8396	42.376223	-82.937015
Jefferson Chevrolet	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34912	42.376223	-82.937015
Don Cartage Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15323	42.376226	-82.97165
Lake Pointe	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35492	42.376469	-82.936432
Jess's Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5965	42.376682	-82.934728
Crown Enterprises Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14092	42.377071	-82.967483
Lake Oil Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14102	42.378868	-82.94795
Abandoned Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002298	42.380396	-83.001142
Mack Avenue Engine Plant	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3859	42.380632	-82.976951
Mack Avenue Engine Plant #1	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39368	42.380864	-82.979616
Former Gasoline Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005662	42.38146068	-82.93954662
Abandoned Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000895	42.381729	-82.939333
Helen Dekorse	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36446	42.381917	-82.928096
W & H Gas & More	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3332	42.382074	-82.997701
Universal Petro	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5678	42.382213	-82.996558
Brake Shop	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38846	42.382258	-82.938711
Lloyds Garage	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000020	42.382384	-82.996131
Mack Road Transfer Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20177	42.383023	-82.973397
Underdevelop Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41519	42.38361296	-82.96729903
Meadows Products Of Michigan	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34587	42.383618	-82.971738
Former Gas Station (10000083)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50006021	42.383657	-82.9477642
FCA US LLC - Mack Avenue Engine Plant II	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40037	42.383887	-82.981609
Mack Fuel	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36302	42.384562	-82.968225
Former Joy Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42641	42.38501059	-82.9873681
Former Whittier Cleaners	Part 213, NREPA - Leaking Underground Storage Tank System Releases	425	42.38504469	-82.94440099
Embree Sign Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34420	42.385376	-82.943753
Benz Fairview Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18946	42.385892	-82.987043
City Of Grosse Pointe	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39489	42.38633	-82.911777
Mack Valero Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10484	42.386689	-82.952897
Shorebank Development Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39487	42.386919	-82.95161
Mary Orhan	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33706	42.387316	-82.947641
Prices Used Cars	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33505	42.387339	-82.983882
Mack & Alter Site	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41372	42.38742116	-82.94762903
Mack & Alter Marathon	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41319	42.387659	-82.948683
Superamerica Property No. 391	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001750	42.387721	-82.971419
U-haul Co of Detroit	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5091	42.38854	-83.008176
8200 Harper Avenue	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42693	42.38871388	-83.01900394
Firestone Store #2535/015318	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7815	42.388957	-82.97935
R C Krausmann	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8881	42.38906264	-82.91837283
Village Marathon	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9345	42.389086	-82.919788
DDOT Shoemaker Garage	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13466	42.389122	-82.985537
C W Mungo Contracting Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37990	42.389238	-82.994798
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005233	42.38931503	-82.98934222
City of Detroit	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41622	42.38947157	-82.9885468
Former Fisher & Maumee Automotiv	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3413	42.38951	-82.903487
Carco Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14103	42.389528	-82.99833
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005341	42.38956542	-82.99573015
Mack Management LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5794	42.389826	-82.936467

Site Name	Type	ID	Latitude	Longitude
Farm Fresh	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41897	42.39	-82.903889
Harper-Fischer Shell Service Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16140	42.390668	-83.014213
Gays Fine Cleaners	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4785	42.390929	-82.933408
Amin Shariff	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2295	42.390946	-82.970981
French Mini Mart Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10491	42.391223	-82.994984
Bridges Sales & Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6170	42.391476	-82.931952
Genes Landscape Service Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36972	42.391637	-82.946077
Pvh Veterinary Hospitals	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37774	42.391702	-82.931355
Marathon Unit #2748	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34047	42.392357	-83.005635
Hern Yard	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8526	42.392749	-82.992248
Stockman Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	333	42.39279	-82.965915
Hurricane Industries LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34880	42.393438	-82.987933
City of Detroit - Planning and Development	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41414	42.3935933	-83.00145094
Chandler Park Service Yard	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19064	42.393656	-82.984249
Ashland Chemical Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16031	42.393678	-83.033699
Former West Side Construction	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40960	42.393739	-83.033483
Tjo Reality LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5714	42.394314	-82.904475
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005639	42.394642	-83.004594
10070 Gratiot Property LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33684	42.39486	-83.003979
Warren & Lakewood Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33239	42.394903	-82.960959
East Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38159	42.39493	-82.92225
VIP's Hand Car Wash	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41696	42.39498274	-82.95988596
Con	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001588	42.395186	-82.921925
PVS Technologies Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33676	42.395215	-82.996316
Pvs Chemicals Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6711	42.395249	-82.995349
Ken Meade Leasing	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18287	42.395515	-82.902408
Refining Co/fruehauf Trailer	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39308	42.395751	-82.993906
Pvs Technologies Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37660	42.395809	-82.998181
Parking Lot	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41461	42.39595384	-83.0352713
Maria Provenzano Revocable Trust	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36726	42.396409	-82.956809
OZ Petroleum	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3216	42.396731	-82.955084
Fire Dept Engine #52	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19122	42.39689	-82.956151
Henry Ford Cottage Hospital	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16840	42.39732921	-82.9031969
Detroit Equipment Repair	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37153	42.397723	-83.035155
Central Service Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33149	42.397731	-83.034581
Barclay Marine Distributor	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35630	42.398239	-83.000338
O J Transport Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20877	42.398283	-83.001709
E & E Engineering, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35778	42.398668	-82.985322
Langone Services	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10499	42.39880443	-82.91873761
David R Holman	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39711	42.399732	-82.981721
Father & Son Fuel Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38482	42.400139	-83.023145
Van Mart Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39697	42.400145	-83.022774
Detroit Forge Plant	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11577	42.400403	-83.028135
Hasco Industries Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000021	42.400954	-82.999936
Reliable Architectural Metals Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12029	42.401343	-83.018027
Ray Laethem Pontiac-bu-gmc Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9102	42.401464	-82.918092
US Equipment	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37645	42.401464	-83.003753
Sahari Enterprise	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16632	42.402189	-82.973485
Greater Rock Of Ages Cogic	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39093	42.40219	-82.99415
Gethsemane Cemetery	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37156	42.402343	-82.999413
BP/Amoco #5637	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5790	42.40284383	-82.91680106
Wayne Steel Progessing	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36999	42.402907	-83.002911
Detroit Police 15th Precinct	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19141	42.403169	-82.998441
Farms Auto Wash Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14445	42.403236	-82.917166
Water Resources Recovery Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21394	42.403477	-83.009837
Chalmer Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5733	42.403772	-82.964222
Meldrum Trucking & Landscaping	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001889	42.404259	-82.916628
Motor Carrier Terminals	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2080	42.404381	-83.018167
Chrysler/acustar Detroit Axle	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16536	42.404774	-83.030698
Pizza Hut/Former Gas Station `	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005464	42.40492143	-82.9325351
Motor City Electric Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19719	42.404953	-83.019962
Conner Service Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33292	42.405019	-82.997607
Pointe Dodge	Part 213, NREPA - Leaking Underground Storage Tank System Releases	947	42.405132	-82.916167
C & A Fuel	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10504	42.405411	-82.961542
Moe & Sons Mart LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7366	42.405529	-82.964991
M C Petro	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33143	42.405588	-82.960894
National Car Rental	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21781	42.40562	-82.997203
Warren Cadieux Gas Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18118	42.405702	-82.930408
FCA Transport LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16154	42.406018	-83.013436
Grosse Pointe Farms	Part 213, NREPA - Leaking Underground Storage Tank System Releases	201	42.406278	-82.892097
Lochmoor Chrysler Jeep	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4548	42.406831	-82.915272
Chester Yavor	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5981	42.40694225	-82.9147143
Laith & R Mini Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38352	42.407013	-82.926824
Police Dept Fleet Control	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19145	42.407082	-83.039446
Central Maintenance	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14398	42.407093	-83.043025
Grocery Store Warehouse	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005334	42.407403	-82.914471
Russo Schebil Enterprises, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4549	42.407543	-82.914524
Vacant Property (10000356)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50006138	42.40789276	-83.02369411
Gunston & Gratiot	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5673	42.408033	-82.995567
Kentucky Fried Chicken	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37019	42.408048	-82.924846
Former Sunoco Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005692	42.4085906	-82.9506504
City of Detroit Police Precinct #9	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19142	42.408613	-82.995177
Signature Flight Support	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2604	42.408743	-83.002788
Lynch Road Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13212	42.409029	-83.009472
Vanopdenbosch Construction Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39639	42.409569	-82.919881
Artic Rentals Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12168	42.409571	-83.053405
Friendly Restaurant #553	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001955	42.410768	-82.912798
Mobil	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2393	42.411192	-83.005142
Country Club Of Detroit	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11477	42.412151	-82.892334
The Brake Shop Of Detroit	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36030	42.412953	-82.941521
Dpw Garage	Part 213, NREPA - Leaking Underground Storage Tank System Releases	202	42.413177	-82.907574
Clark	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35557	42.413296	-83.023248
Forest Lawn Memorial Park	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36203	42.413904	-83.023638
Shell Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10498	42.413953	-82.99166
Pointe Services	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10483	42.41435	-82.912032
Belle Tire Distributors Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38104	42.414542	-82.911083
Thomas Gajewski	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10478	42.41462	-82.96461
Midwest Transportation	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35838	42.415215	-83.034697
Jacks Super Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9171	42.415329	-82.948862
Ba-do Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4387	42.415446	-82.949899
Sears Roebuck & Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38110	42.415519	-82.910744
Police Dept Precinct #11	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19137	42.415531	-83.061173
Detroit City Petroleum Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4917	42.415771	-83.061353
Safeway Transportation Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7667	42.415802	-83.061794
Eastown Distributors	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15248	42.415815	-83.031284
Arrow Uniform Rental Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17104	42.415889	-83.031232
Davison & Ryan Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39770	42.415889	-83.060228
Amil Aikassynonan	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16623	42.415992	-82.937092

Site Name	Type	ID	Latitude	Longitude
Cassens Transport	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8497	42.416073	-83.026793
Marathon Unit #1267	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21723	42.416193	-82.97219
Harper Investments LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8552	42.416276	-82.93716
Sana Mini Mart Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5954	42.416281	-82.936407
Shell Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14385	42.416295	-82.937119
Paramount Fabricating	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000457	42.416423	-83.031266
Hala Mini Mart Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4914	42.416574	-82.936466
Cadillac Oil Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21873	42.416921	-83.030783
Brothers Gas & Food	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34401	42.417049	-82.972743
Warehouse Building	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41776	42.41710558	-83.03480635
Refari Fuel Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15065	42.417258	-82.934662
Rto Quick Lube	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34270	42.417454	-82.934921
GP Petro Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21473	42.41746187	-82.91012236
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005874	42.41766602	-82.98921748
Safe Aquisition Com LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19870	42.418513	-82.988202
3640 McNichols Property LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14937	42.418542	-83.064346
Sylhet Motors and Service LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41182	42.418763	-83.062155
St John Hospital	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12169	42.418836	-82.914673
Mitch Binkowski	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35614	42.418868	-83.047571
D & H Auto	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17706	42.418981	-83.042485
Eagle Fly Petro	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18527	42.419058	-83.039047
BHGI Company	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35357	42.419077	-83.052696
Allied Towing	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8626	42.419088	-83.050167
Federal Pipe & Supply Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7392	42.419121	-83.036146
6556 McNichols	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19920	42.41914	-83.035217
Hare Leasing Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3719	42.419291	-83.026628
Repair Ind	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35702	42.419411	-83.035382
Safeway Acquisition Co LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12267	42.419452	-82.96382
Baayoun Service Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6204	42.419483	-83.031309
Joseph Strobl	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36093	42.4195	-82.959744
Eagles Petroleum Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2147	42.419527	-83.012558
Silva Catering Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33319	42.419596	-83.051273
Mouhajer Enterprises Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35351	42.419613	-83.023851
Mt Olivet Cemetery	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36823	42.419622	-83.023479
Mobil Oil Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3217	42.420065	-83.00396
Southland Corp Property #20156	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002017	42.420139	-83.002921
Houston Mini Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33177	42.420232	-82.974384
Fire Dept Engine #50	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19120	42.420475	-82.983649
Aureus Holdings	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14334	42.420488	-83.038619
Ruzoija Ljuljanovic	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10187	42.420914	-83.047034
Franklin Land Holdings LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20313	42.421142	-83.03866
Delta Resins & Refractories, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	582	42.421295	-83.062314
Metropolitan Alloys Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6236	42.421458	-83.062689
Ibrahim Auto Repair	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6222	42.421648	-83.045085
Wakay Ind	Part 213, NREPA - Leaking Underground Storage Tank System Releases	991	42.421906	-83.038678
American Vault & Conrete Prod.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18334	42.421964	-83.065954
Fire Dept Engine #47	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19117	42.422369	-83.038697
Ryan Correctional Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002477	42.422449	-83.062342
Mack Prestwick Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001942	42.422474	-82.910189
Al's Auto Repair Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35425	42.423092	-82.942099
Mound Correctional Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002478	42.423572	-83.04345
Former Arnold Tool	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005754	42.42410556	-83.03827396
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005685	42.42465617	-83.03888041
Marmon / Keystone Corp Huron Street	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41537	42.42474003	-83.06273716
Denby High School	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5453	42.4248	-82.960425
Former Harper Avenue Filling Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005320	42.42481068	-82.92864256
B & S Oil Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8233	42.424935	-82.947738
Judd Warehousing LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16130	42.42532	-83.053782
M N B Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19898	42.425624	-82.98776
Republic Waste Services of Michigan	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37845	42.425854	-83.057384
Master Metals	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39944	42.425876	-83.056415
Conant Gas and Quick Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33688	42.425938	-83.068794
Sana Energy & Management Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10486	42.425948	-82.926827
MDOC - Detroit Regional Correction Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33026	42.425958	-83.052809
Van Dyke Petro LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19202	42.426104	-83.023744
Ajax Materials Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13329	42.426117	-83.04554
Former Braver Lumber	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002621	42.426123	-83.049803
J. Fons Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36361	42.426326	-83.035766
Wfj Ready Mix	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34829	42.426519	-83.038877
Franks Nursery & Crafts	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002037	42.426602	-83.035681
Mt Zion Church	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002127	42.426664	-82.984539
Mt Olivet Service Area	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001041	42.426855	-83.013226
Speedy	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34255	42.426912	-82.984731
Pan-glo Detroit	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13656	42.427089	-83.033439
Unoccupied	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001956	42.427282	-83.014088
Flagstar Bank	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2441	42.427649	-82.909513
Detroit Pingree Bldg CO (M16102)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11691	42.427765	-82.984596
Kuality Kar Kare	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21432	42.427776	-82.954478
Grosse Pointe Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16641	42.428231	-82.909068
Park Place Of Harper Woods	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18547	42.428251	-82.922139
Sunoco 0008-2651	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5948	42.428875	-82.956451
N & J	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10479	42.429297	-82.957411
Fueling Deport	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42022	42.429752	-83.036691
Harper Woods Garage	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11638	42.429811	-82.924289
Gratiot Bump Shop	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36738	42.430125	-82.980682
PTI	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36114	42.430284	-83.034065
Vacant Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001585	42.431811	-82.979573
Detroit Twinbrook CO (M16108)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11686	42.431827	-83.062932
J & J Tire & Auto Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33162	42.432077	-83.023968
City Of Harper Woods Fire Dept.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15199	42.432084	-82.924296
Qdw/queens Chapel	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35958	42.432869	-83.073877
Micks Auto	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37091	42.433119	-83.060871
Shaif Group 3 LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5786	42.433341	-83.063794
Seven Mile & Ryan	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10450	42.433405	-83.062338
F & I Food Mart Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2286	42.433443	-83.045725
Solaiman Mini Mart LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38315	42.433533	-83.053473
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005419	42.43356	-82.90896
Tens Auto Wash	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18744	42.433851	-83.039697
Durako Paint & Color Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16208	42.433868	-83.038685
Shell Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10445	42.43389	-83.023678
Terminal Steel & Equipment Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	624	42.433947	-83.035614
Nortown Convenience	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34366	42.433983	-83.033831
K I Investment	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18511	42.434054	-83.014594
Uhaul 752-54	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15346	42.434175	-83.02307
Philmar L.c.c (formerly U-metro)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38865	42.434293	-83.016721
Beedy Enterprises Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13639	42.434328	-83.014571
Maxx Beauty Supply	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005706	42.43441072	-82.97856827
Oscar Salery	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40298	42.434548	-83.005444

Site Name	Type	ID	Latitude	Longitude
Amoco Oil #6406	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4963	42.434671	-82.952947
A.N.S. Auto Repair Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38505	42.434844	-82.985924
Consolidated Unit #2249	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17442	42.434871	-82.985092
Ajrouche 7 Mile LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40494	42.43490062	-82.99347533
13033 Seven Mile LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39231	42.434959	-82.99106
Chalmers Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11897	42.43496	-82.974608
Amoco Oil Station #7219	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21321	42.435062	-82.983195
Former Joe's Marathon Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005348	42.43509333	-82.95386122
Former Advance Auto Center Site	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41448	42.43509616	-82.97929321
Sulaiman Enterprises LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35028	42.435146	-82.985107
Grosse Pointe Yacht Club	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18432	42.435244	-82.875845
Janush Brothers Moving & Storage	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18244	42.43529	-83.075553
Najar Petroleum LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5951	42.435556	-82.965
Frank Calcaterra Funeral Home	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002049	42.435631	-82.955617
Former Ned's Firestone Store	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40007	42.435686	-82.977019
Frankel Metal Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000001	42.435904	-83.037604
Jerry Burton	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39084	42.436322	-83.014362
Village of Grosse Pointe Shores	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1296	42.437053	-82.877318
Puritan St Church Of Christ Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39960	42.437222	-83.076957
Montgomery Wards	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002422	42.437498	-82.976242
Goodyear Tire & Rubber Co #1539	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21714	42.438324	-82.975287
Quick Stop Brake Shop Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34827	42.438405	-83.024624
Toms Marathon Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4234	42.438702	-82.908026
Atlas Oil Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17448	42.438943	-83.076397
Denton Enterprises, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18349	42.439156	-82.907969
Curto Enterprises	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10906	42.43928	-82.919453
Randazzos Fruit Market	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001796	42.4394	-83.044234
Elliott	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41879	42.43963774	-83.03946213
Fire Dept Engine #60	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19127	42.440209	-83.00509
Former Creative Industries	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40490	42.440587	-83.051403
Abys American Gas Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33163	42.440685	-83.024357
Kmart #4027	Part 213, NREPA - Leaking Underground Storage Tank System Releases	781	42.440878	-83.035939
Outer Drive Mfg Tech Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1727	42.440963	-83.040207
AT & T Michigan Detroit NE Garage & Storeroom	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11652	42.441099	-83.013033
Amoco SS #5460	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5804	42.441256	-83.024385
Chrysler LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12751	42.441333	-83.017973
Holy Cross Hospital	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7747	42.441451	-83.020636
14534 Tacoma	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14494	42.44158	-82.972911
PDS Properties - Mr Frank Sheker	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10270	42.442058	-83.005177
Franks Nursery Warehouse (former	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37757	42.442167	-83.005181
Whittar Steel Strip	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11473	42.442293	-83.034523
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005229	42.442763	-82.972555
Amoco SS #5644	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5788	42.442998	-82.907285
BCA of Detroit LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1616	42.443287	-82.970595
Fayez Aliahmad	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2085	42.44330227	-82.94555434
Hoover Yard	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8527	42.443358	-83.005237
Mack & Vernier Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16613	42.44367778	-82.90620097
Air Products & Chemicals Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19536	42.443969	-83.034607
Judd Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7703	42.444441	-83.03463
Marathon	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12378	42.444713	-83.024549
Chrysler LLC - Mound Road Engine	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10079	42.445133	-83.044112
15130 Gratiot Avenue LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20317	42.445419	-82.970619
Hassan Karnib	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3716	42.44544268	-82.91650602
Cueter Brothers Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15840	42.445905	-82.907018
BP	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17463	42.44632781	-82.91603931
BP	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19368	42.446859	-83.084213
8 Mile & Mitchell Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10210	42.447059	-83.072943
Terry's Auto Repair	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37188	42.447073	-83.071941
Sami Service Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19191	42.44709	-83.07099
Michigan Motor Exchange	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38902	42.447109	-83.069907
Quick Stop & Go Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16096	42.447177	-83.065767
Former Gasoline Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41249	42.447179	-83.076491
Clark Oil #546	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36480	42.447208	-83.062639
A & A Petro Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19947	42.447222	-83.044577
General Motors Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21779	42.447329	-83.034769
Former Cooper Yard Site	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42120	42.44741159	-83.03643181
Towne Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38567	42.447435	-83.051533
Wood Motors Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12876	42.447922	-82.969432
8076 Property LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37108	42.447963	-83.023075
Former Speedway	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41152	42.448203	-83.021387
Shell Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10464	42.448288	-83.044956
Fpt Auto Shred Division Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2601	42.448459	-83.009453
Hassan Fahs	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14324	42.448648	-83.023381
Community Central Bank	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42079	42.4486991	-82.90498407
Unknown	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005770	42.44882283	-83.02523724
Assi Real Estate LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2207	42.448935	-83.020103
Carboloy Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17122	42.449117	-83.008843
Sabiston Building Supply Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14133	42.44914	-83.007241
Marathon Unit #1273	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18117	42.449196	-82.985633
Royal Carpet Distributors	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20986	42.449218	-83.006652
Guardian Steel Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37324	42.449249	-83.004473
C.j Link Lumber Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18738	42.449296	-83.003984
Minit-lube #1400	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4871	42.449328	-82.980008
Haveen Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19193	42.449352	-82.978225
Central Metal	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37685	42.449381	-83.000906
Eastland Imports Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1159	42.44941	-82.975397
Alaa Petroleum Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5737	42.449638	-83.00157
Al-Oud LLLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3218	42.449733	-82.9678
Dept of Public Works	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8778	42.44983077	-82.89110013
City of Harper Woods	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7302	42.449975	-82.925668
The Milbrand Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36138	42.450017	-82.985662
Al Longford, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4547	42.45002	-82.974862
Sadina Mini Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16365	42.45003998	-82.94058689
Car Wash Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002331	42.450276	-82.967903
Coleman Rent To Own	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33057	42.450315	-82.963671
BP Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10490	42.45041	-82.966422
Evergreen Home & Garden Center I	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1298	42.450683	-82.954754
Jiffy Lube #1131	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16711	42.450724	-82.942683
IS Real Estate LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5650	42.450867	-82.936452
Ed's Service Station Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16701	42.451053	-82.91502
Aureus Holdings LTD	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41970	42.45134856	-83.00499107
K & B Mounting, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4283	42.451437	-83.044785
Fuel Point Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13994	42.45255053	-82.93818363
Midwest Fuel	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34295	42.453215	-83.025333
Sahara Construction Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40610	42.453451	-83.025803
Reno Machinery & Engr Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37478	42.453724	-83.00567
Edsel & Eleanor Ford House	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8627	42.4543338	-82.87367577
Desilva Automotive	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000575	42.45452473	-82.96402887

Site Name	Type	ID	Latitude	Longitude
Cct De'couper Ind	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39817	42.454995	-83.00572
Schoenherr Iron Works	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37961	42.455042	-82.986201
Rene Vanassche & Sons Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39749	42.455118	-82.998073
Equipment Manufacturing	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000365	42.455137	-83.005352
Auto Hut Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3887	42.455162	-82.902805
Zazz Fuel Mart LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16481	42.455335	-82.91222
Wolverine Metal Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36143	42.455495	-83.005738
Van Dyke & Toepfor Gas & More Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10459	42.45583	-83.026613
Rem & Sons Mechanical Contractor	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21193	42.455929	-82.985858
Cargoflow Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4097	42.456288	-82.998901
Dy-chem Products Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8663	42.456542	-83.005404
Union Carbide Corp Linde Division	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3826	42.456689	-82.99731
Fayez Aliahmad	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12296	42.456745	-82.98648
Ring Screw Division	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21729	42.457427	-83.034844
B & M Auto Service Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10476	42.457598	-82.90119
E. Detroit Public School	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001207	42.457679	-82.951629
Merollis Chevrolet	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6775	42.457962	-82.962145
Merollis Chevrolet Sales & Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6776	42.458168	-82.962838
Cold Heading Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1757	42.458377	-83.005847
Commercial Site	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002578	42.458444	-82.90134
GFL Environmental USA	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35031	42.458522	-83.009487
S & K Muffler	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40384	42.458635	-83.026443
Merollis Chevrovet Sales & Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21483	42.458937	-82.962334
Mr Joseph Kraemer	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38894	42.459098	-82.901437
Ajax Bolt & Screw Division	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15095	42.459533	-83.01028
7-11 Store	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21558	42.459789	-82.88208
Niagara LaSalle	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10918	42.459862	-83.000792
Best Block Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18063	42.459932	-82.995717
Shores Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18289	42.460018	-82.900885
Square Deal Auto	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1765	42.460163	-82.959668
American Drive Train	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000364	42.460841	-82.9942
Hofley Manufacturing Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42	42.460958	-82.993689
Ever Fresh Juice	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001571	42.461193	-83.036551
Fast Track Ventures Acquistions, LLC Harper Clark	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12258	42.4617	-82.910133
Gratiot Site	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005327	42.46177564	-82.9595312
E. Detroit Public School	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001210	42.462349	-82.968532
Warren Fire Dept Headquarters	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18737	42.462383	-83.033418
Everfresh Juice Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6330	42.462753	-83.035
Ahmed Hijazi	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15700	42.462821	-83.032461
Ready Mix Concrete, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18241	42.462972	-83.037003
Advance Motor	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38188	42.462977	-83.026346
Speedway #8871	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16345	42.462995	-83.005228
Abro13 Property - 7225 Nine Mile Road LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42529	42.46322	-83.03002
Razeen Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39366	42.463237	-82.991979
Mr Mike St Pierre	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38367	42.463283	-83.006036
Warren Fire Station No. 1	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12526	42.463304	-83.022317
Condor Manufacturing Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	283	42.463345	-83.002766
Van Dyke Collision Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37861	42.463391	-83.015574
Warren Gas & Food Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12322	42.463425	-83.032115
Serv. Bldg Van Dyke Pub Schol	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12898	42.463484	-83.009943
Midwest Paper Products	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35918	42.463512	-82.998224
Inalfa SSI off Systems	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21576	42.463551	-82.996879
Sam's Tire Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002762	42.463627	-82.986123
Weyerhaeuser Paper Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2133	42.463636	-82.993794
Warren Fire Station No. 2	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12527	42.463701	-82.989188
9 & Hoover Property LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14723	42.463708	-83.00621
Universal Ambulance Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000431	42.46371	-82.988642
Bundy Tubing Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15692	42.463756	-82.999216
St Clair Shores Main Post Office	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9837	42.463791	-82.899342
Acco Systems	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2821	42.463869	-82.995329
Vandyke Food Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	39910	42.463902	-83.026477
Metro Radiator	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4849	42.463956	-82.885177
Bobs Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10638	42.463977	-82.976073
Kmart #4177	Part 213, NREPA - Leaking Underground Storage Tank System Releases	754	42.46408	-82.90909
7-Eleven #32375	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5382	42.464122	-82.986129
Warren Eastside Concrete LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11380	42.464202	-82.992433
Sterling Auto Sales	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34729	42.464453	-82.956142
9 Mile & Hoover	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15096	42.464482	-83.000968
9 Mile I-94 Mobil - Repair Shop	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14364	42.464694	-82.948782
I S Real Estste LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4440	42.46473312	-82.93904194
Eastpointe Police Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7015	42.464738	-82.957463
JSD Enterprise Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5672	42.46476531	-82.9585416
Eastpointe Housing Commission	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33731	42.46482	-82.960408
Eastpointe Housing Commission	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33730	42.464826	-82.960506
John & Holger Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	334	42.464894	-82.951025
Bucks Sunoco Service Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10181	42.4649	-82.943838
Groesbeck Lumber Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37018	42.465013	-82.991073
Minit-lube #1268	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19958	42.465084	-82.927147
Former Gasoline Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005822	42.46509437	-82.92978208
United Lighting Standards, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36064	42.46512	-82.990991
Former Larrigo Nine Mile Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005904	42.46513967	-82.92755245
Kroger #D-495	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10474	42.465237	-82.88609
Bank of America - Eastpointe M18-058	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005906	42.46526256	-82.92293331
9 Mile Mobil	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16699	42.46527	-82.920235
Essex Specialty Products Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14017	42.465286	-83.035714
Henkel Corp Parker + Amchem	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11584	42.46533	-83.035722
Former Metal Processing Plant	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002764	42.465419	-82.949963
Mancini Construction, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15809	42.465436	-82.986181
EP Property LLC Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10722	42.46557	-82.93085
Auto Repair Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005476	42.46559283	-82.9897779
Chapaton East Retention Basin	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35936	42.465645	-82.885823
Nine & Harper Fuel Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3219	42.465683	-82.908632
Kens South Park Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7330	42.465816	-82.957834
Speedway #2317	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17464	42.46588647	-82.92228349
9 and Kelly Sunoco	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5955	42.465908	-82.926007
Express Fueling #1	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17855	42.46611178	-82.91680106
Nautical Mile Pitstop Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5754	42.466208	-82.885575
High School	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37727	42.466211	-82.902955
Towing & Auto Service Facility	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005477	42.46655173	-82.89429739
Roy Obrien Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9115	42.466649	-82.897551
Richards Automotive	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005462	42.46673476	-82.90788205
Tri County Truck Repair	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001603	42.466885	-82.988567
Nor-cote	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6383	42.467017	-83.009298
Tri-county Intl Trucks Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	301	42.467239	-82.988978
Metrd-detroit Sign, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34124	42.46729	-83.00582
Harper Sunoco Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21042	42.46742	-82.906545
Formsprag-warren	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37653	42.467529	-83.006188
South Lake Schools	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6854	42.467588	-82.897252

Site Name	Type	ID	Latitude	Longitude
Former Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42355	42.46766365	-82.90740463
The Cross Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14097	42.467757	-83.006185
Saad Yono	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005342	42.46837502	-82.88705614
Blue Star Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42105	42.46930448	-82.99715328
Emerald City Harbor Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10165	42.469422	-82.887808
Angell-ricard	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9676	42.469629	-82.995928
St Clair Shores Builders Supply	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35280	42.46968	-82.907081
Ferris Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001851	42.46983	-82.887737
Former Gas Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005391	42.46994558	-82.90596896
City Of Center Line	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6065	42.470022	-83.027389
Woodland Elementary	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001208	42.470306	-82.943674
Little Mack Medical	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41851	42.470556	-82.907222
Motor Pool	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18808	42.47057	-82.915622
Slim Petroleum LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7945	42.470737	-82.985868
Dougherty - Hanna Resources	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34218	42.470942	-82.989715
Warren Water Garage	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3886	42.471208	-82.990803
City of Warren DPW	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18735	42.471208	-82.990829
Blakely Products Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19276	42.471402	-82.983734
Michigan Harbor Properties LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16507	42.471443	-82.881192
Jefferson Beach Marina	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18192	42.471536	-82.888554
Speedway #2292	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17480	42.471777	-82.95388
Meyers Brothers Automotive Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36597	42.471864	-82.985504
Ed Rinke Buick	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4611	42.472249	-83.027689
Colonial Dodge Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40646	42.472331	-82.952715
Colonial Dodge Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11412	42.472447	-82.953495
S & k Muffler (Former)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005681	42.47252157	-82.88943124
Mahon Door Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002291	42.472637	-83.003041
Soulliere Landscaping Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9843	42.472683	-82.907131
Miller Marina Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18291	42.472758	-82.882029
Uhaul 754-76 (mack & Harper Ctr)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15335	42.472861	-82.907142
#4111 United Oil Corp Tulsa	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11832	42.472943	-82.889254
Ruggeri Electrical Contracting C	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17919	42.473234	-82.911319
Taylor Roofing & Maint., Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10697	42.473262	-82.910356
Motor City Tobacco & Candy Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	853	42.473363	-82.906792
Erb Lumber Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10850	42.475413	-82.986594
Tamaroff Acura	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15038	42.475552	-82.950566
Jerry Lynch Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36832	42.475724	-82.951351
Atsalis Brothers Painting Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10123	42.476195	-82.982799
J, S & S Lubricants Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1404	42.476578	-82.950693
Van - 10 LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15087	42.47664213	-83.02671262
Bavarian Motor Village Ltd	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35130	42.47709	-82.950457
I S Real Estate LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16695	42.47719	-83.027732
Millers Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8371	42.477388	-82.949352
DHIA LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4922	42.47742	-83.00635
Marathon Gas	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33169	42.477597	-83.026547
Jet	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7365	42.477612	-83.010838
FTV-11650 E 10 Mile	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18154	42.477667	-83.005496
Chas F Irish Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9732	42.47774	-82.981143
U-haul 754-78	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15333	42.477865	-82.981471
Frescuras Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35993	42.477938	-83.005944
Widger Chemical Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7014	42.47818	-82.986173
Fayez Investment LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1594	42.478182	-82.987423
10 & Hoover Fuel LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19223	42.47822	-83.006398
Ed & Toms Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36479	42.478409	-82.980611
Capri Investment Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16797	42.47843	-82.982092
Precision Tune	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37198	42.478471	-82.986713
1365	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34507	42.478559	-82.980921
Super Car Wash Express Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1503	42.478562	-82.986717
Gastmeiers Service Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8677	42.478949	-82.980199
G L Seibert Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16796	42.4791	-82.975613
City of Easpointe DPW	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7174	42.479378	-82.938408
Water/sewer Sewer Dept	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38091	42.479724	-82.93923
10 Mile & Kelly Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16712	42.47975886	-82.92654284
10 Mile & I-94 Petro-Mart Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5743	42.47986078	-82.91736969
10 Mile and Gratiot Sunoco Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5961	42.479893	-82.94756
Speedway #6201	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11877	42.479978	-82.965612
Adams Rib	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13797	42.479981	-82.906967
Midwest Convention Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11953	42.480086	-82.934848
Variety Vendors	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34145	42.480103	-83.006576
Henry Ford Macomb Hospital - Warren	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36944	42.480108	-82.989065
Harbor Auto Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16803	42.48023	-82.889622
Sunoco Duns #0008-3352	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5980	42.48025	-82.926729
Plymouth Petro LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5827	42.480387	-82.967688
Shell	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10475	42.480435	-82.90614167
Amoco Oil Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21285	42.480497	-82.901933
Shell Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37798	42.480708	-82.918142
Eftec North America	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7013	42.480809	-82.984401
Speedway #8854	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16351	42.48089667	-82.907815
Michigan Bell Telephone Co / D/B/A SBC Michigan (M19548)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11611	42.480902	-82.93615
IBB Properties Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16702	42.48144833	-82.90677
Cadillac Gage Textron	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000363	42.483068	-82.977103
Tri-city Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21879	42.48327	-82.945483
Sisters/bon Secours Nursing Ctr	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38623	42.483277	-82.889594
City Of Warren Sanitation Div	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5861	42.483407	-82.981077
Lawn Senior Citizens Building	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37800	42.483786	-82.940166
Roseville Car Wash	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10734	42.484197	-82.944869
Martin Retention Basin	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35935	42.484903	-82.890833
Roseville Chrysler-Plymouth Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13422	42.48552	-82.94307
Hoover eleven Shopping Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	41492	42.48575068	-83.00657568
Eastside Petro Minimart LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38323	42.48629833	-82.89839
James Mctevia	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000428	42.4863	-82.97801
Roseville Fire Department	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7133	42.487038	-82.94176
Bon Heur Pump Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34691	42.487044	-82.898588
Quick & Clean Car Wash	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38927	42.487413	-82.943701
Prince Macoroni Co Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10457	42.487634	-82.974106
Midwest Brake Bond Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35666	42.488298	-82.973608
M-97 Auto Dealer	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19203	42.488602	-82.973377
Valley Auto Parts Inc (dba) Hermiz Auto Parts	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4521	42.488956	-82.977121
Roadway Express, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16981	42.491272	-82.977713
Shock Brothers Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40722	42.49143	-82.977218
Dicicco Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20047	42.491448	-83.00629
Michigan Fuels Retail #731654	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3222	42.491512	-83.007277
Macomb County Locksmith	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36029	42.492327	-82.940481
F&R Fuel Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12313	42.492875	-82.940335
Metro Tire Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21743	42.492884	-82.940119
Precision Tune	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35646	42.493248	-82.897342
Fayer Investment LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33434	42.493304	-82.987575
696 & Gratiot Mobil Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19046	42.493707	-82.939445

Site Name	Type	ID	Latitude	Longitude
20th Century Auto Sales Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37928	42.493824	-82.938505
Lakeview Public Schools	Part 213, NREPA - Leaking Underground Storage Tank System Releases	189	42.494273	-82.907313
Former Gasoline Suc Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001850	42.495091	-82.897465
Sunoco 0008-4236	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19875	42.495158	-82.907671
Little Mack Investors Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8679	42.495218	-82.90809
N & B Enterprises Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4902	42.495337	-82.937293
Instant Oil Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000541	42.495339	-82.897855
Shell Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10472	42.496201	-82.898117
Koch Automotive Products Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19399	42.49657	-82.972138
Roseville CO (M19530)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11763	42.49660833	-82.936075
Omega Petro Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7359	42.496678	-82.967597
Ryder Transportation Serv #0274	Part 213, NREPA - Leaking Underground Storage Tank System Releases	8060	42.49753667	-82.96751667
Capitani Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001606	42.500886	-82.963697
Burns Automatic	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2635	42.50109	-82.963968
27990 Groesbeck LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37804	42.501335	-82.963063
Michigan Cartage	Part 213, NREPA - Leaking Underground Storage Tank System Releases	9177	42.501579	-82.967183
Hot & Now	Part 213, NREPA - Leaking Underground Storage Tank System Releases	42068	42.501919	-82.93408
1327	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18518	42.50246167	-82.93402167
Wolverine Bronze Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20906	42.502655	-82.968002
Former Gas Station /TuffyMuffler	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005571	42.502778	-82.8975
Taco Bell	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37524	42.502895	-82.898208
Lanzo Construction	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005147	42.502923	-82.962123
Little Mack Marathon	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10500	42.503018	-82.907563
Aero Grinding Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36897	42.503289	-82.961847
Sunoco #0008-3468	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002749	42.50384137	-82.93196994
Roseville Gas	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10488	42.503995	-82.93321667
Tia Shell Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16940	42.50585167	-82.89866333
Speedway #5495	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3073	42.50608667	-82.93049667
Uncle Ed's Oil Shoppes	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16519	42.506291	-82.898051
FDP Jefferson LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17609	42.507117	-82.881863
Sparks Tune-up	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000344	42.507448	-82.92949
Ayar Property Mgt Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40597	42.507723	-82.881547
Minit-lube (1403)/former	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13010	42.509695	-82.908326
12 Mile & Gratiot Service Center Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16700	42.50970833	-82.927895
12 Mile & Gratiot Short Stop	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20814	42.510042	-82.928877
Speedway #8838	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16342	42.510175	-82.935915
Standard Federal Bank	Part 213, NREPA - Leaking Underground Storage Tank System Releases	40560	42.510475	-82.908811
A & J Fuel Mart Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18146	42.510487	-82.916817
Midas Muffler	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21845	42.510628	-82.898675
Arnold Automotive	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5134	42.51084	-82.927058
12 Mile & Little Mack Mobil	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16743	42.510867	-82.907998
HY & Y Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12357	42.51096833	-82.897715
Roseville Electric, Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4595	42.513207	-82.926665
Bethlehem Lutheran Church & Sch	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15638	42.515472	-82.925217
Redline Automotive	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35530	42.51548	-82.898868
Modern Mirror & Glass Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19519	42.515498	-82.906885
Police Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7487	42.515798	-82.92501
City Of Roseville	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001649	42.515807	-82.925003
Kent-moore Spx Operation	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33064	42.516188	-82.908588
Roseville Fire Department	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7134	42.516957	-82.929114
Olsen's Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5370	42.517119	-82.924167
City Of Roseville	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001149	42.51725477	-82.92846327
Pro Golf/discount Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38677	42.51766	-82.922861
Former MEGA Precast/Former National Precast	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7665	42.518425	-82.90651167
Cochran Drain Tile Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6487	42.5187	-82.908693
Harper Fuel Mart Inc.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3961	42.521897	-82.897998
Jeffrey Automotive Group	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5843	42.52337667	-82.91797
Lake Shore High	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000340	42.523537	-82.882457
Goodyear Tire Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21774	42.523607	-82.898394
Union 76	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001564	42.523768	-82.920513
Meijer Store #63	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33024	42.524257	-82.908492
Kmart #3262	Part 213, NREPA - Leaking Underground Storage Tank System Releases	801	42.525015	-82.905672
Kroger D-074	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19042	42.52533	-82.909227
Speedway #8839	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16420	42.525598	-82.908508
13 & Harper LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16855	42.52585	-82.89723167
32309 Jefferson Property LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19204	42.527127	-82.874578
Shadowoods Auto Center Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6016	42.527427	-82.91759
Midas Realty Corp	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21815	42.528659	-82.916608
Samad Enterprises Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17518	42.529187	-82.909715
Pizza Hut	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005448	42.52942132	-82.91660293
MS Fuels 1	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21325	42.532513	-82.913073
St Clair Shores Country Club	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33469	42.532587	-82.892411
Ram Fuel LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10473	42.532797	-82.887485
Sears Roebuck & Co Store #1450	Part 213, NREPA - Leaking Underground Storage Tank System Releases	13897	42.533134	-82.913686
Lees Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50001961	42.534433	-82.868193
The Brake Shop	Part 213, NREPA - Leaking Underground Storage Tank System Releases	33063	42.534639	-82.91182
Gratiot Gas & Food Mart	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2258	42.539213	-82.909897
Sav Air Products Co	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38012	42.539498	-82.885936
Marsack Sand & Gravel Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3628	42.539605	-82.906839
Hebrew Memorial Park	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17100	42.540028	-82.899243
Former Speedy Muffler Shop	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50002637	42.540555	-82.907979
Mount Clemens Site No. 7	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12564	42.541771	-82.889956
Elks Club	Part 213, NREPA - Leaking Underground Storage Tank System Releases	36421	42.544448	-82.904217
Fisca Station No 0-002906	Part 213, NREPA - Leaking Underground Storage Tank System Releases	2906	42.545773	-82.904456
Star Oil LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16347	42.545955	-82.90383
Uni-Dig Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3725	42.54689455	-82.8991414
Johns Lumber	Part 213, NREPA - Leaking Underground Storage Tank System Releases	35852	42.548174	-82.903735
Roseville North CO (M19541)	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11762	42.548247	-82.902365
Eddys Auto Repair	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1505	42.548653	-82.854863
Datta Enterprises Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19194	42.55051979	-82.90095098
Bill Lee Oldsmobile Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	1796	42.55066	-82.903272
Clinton Township Service Center	Part 213, NREPA - Leaking Underground Storage Tank System Releases	21818	42.551852	-82.879325
Clinton Twp Police Dept.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7022	42.551867	-82.882297
Cf Motorfreight	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34884	42.552173	-82.883907
Nothdurft Tool & Manufacturing	Part 213, NREPA - Leaking Underground Storage Tank System Releases	34866	42.55306	-82.882453
Smart - Macomb Terminal	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17224	42.553777	-82.883353
Clinton Twnshp Fire Dept.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18721	42.55444	-82.903572
1341	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19873	42.55486	-82.87079
Little Mack Market & 15 Mile Rd.	Part 213, NREPA - Leaking Underground Storage Tank System Releases	19916	42.55486608	-82.90996679
Stan & Mikes Auto Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15650	42.555175	-82.870098
Harrison Township Citgo	Part 213, NREPA - Leaking Underground Storage Tank System Releases	12282	42.555338	-82.852595
Clintondale Community Schools	Part 213, NREPA - Leaking Underground Storage Tank System Releases	6835	42.555488	-82.907783
Mobil	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50000504	42.555788	-82.86997
Charter Twp of Clinton Water Dept	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16858	42.556272	-82.868118
Montgomery Ward-regional Shoppin	Part 213, NREPA - Leaking Underground Storage Tank System Releases	20905	42.556332	-82.899172
SA Management Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	11882	42.557108	-82.869685
Commercial Building	Part 213, NREPA - Leaking Underground Storage Tank System Releases	50005205	42.557899	-82.870219
Mike Dorian Ford Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15351	42.561656	-82.895421

Site Name	Type	ID	Latitude	Longitude
Admiral Marina	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18921	42.562729	-82.846184
Hide Away Harbor Marina Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14966	42.56334722	-82.84169384
Wilfred Lowe Property	Part 213, NREPA - Leaking Underground Storage Tank System Releases	38319	42.564345	-82.844889
36315 Express Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18312	42.56461322	-82.89507517
Shell Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	10487	42.565172	-82.893571
Speedway #2332	Part 213, NREPA - Leaking Underground Storage Tank System Releases	17552	42.566313	-82.842907
St John North Shore Hospital	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7328	42.566347	-82.849247
Blue Sky Mobile Vlg/new Appearan	Part 213, NREPA - Leaking Underground Storage Tank System Releases	37598	42.566512	-82.841978
Charter Township of Harrison	Part 213, NREPA - Leaking Underground Storage Tank System Releases	7838	42.5679177	-82.84336218
Pegelo Service Station	Part 213, NREPA - Leaking Underground Storage Tank System Releases	15010	42.568667	-82.84014
Toma Capital LLC	Part 213, NREPA - Leaking Underground Storage Tank System Releases	4939	42.568932	-82.892952
Platinum Petroleum Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	5841	42.56900668	-82.87138053
Zunairah Fuels Inc	Part 213, NREPA - Leaking Underground Storage Tank System Releases	18181	42.57014394	-82.87211009
Jefferson Motor Service	Part 213, NREPA - Leaking Underground Storage Tank System Releases	16042	42.571323	-82.834983
Mobil SS #03-C5T	Part 213, NREPA - Leaking Underground Storage Tank System Releases	3226	42.5717479	-82.87182041
Jimmys Boat Livery	Part 213, NREPA - Leaking Underground Storage Tank System Releases	928	42.573266	-82.821045
Metro Beach Metropark	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14925	42.580138	-82.799523
South River Marina	Part 213, NREPA - Leaking Underground Storage Tank System Releases	14971	42.593737	-82.791849

Appendix D

EGLE SWIPP Guidance Document

DEQ

Department of Environmental Quality
Water Bureau
Drinking Water and Environmental Health Section

Guidance for Surface Water Intake Protection Program (SWIPP)

Since the source water assessments (SWA) have been completed, the state is developing guidance for communities for development of a Surface Water Intake Protection Program (SWIPP). Michigan has a wellhead protection (WHP) program that has been approved by the USEPA. Since this would be the protection program for a system that is supplied with groundwater, it is logical to develop protection programs for surface water systems with the same logic. A SWIPP should have the same basic seven elements that a WHP program has. These are:

- Defining roles and duties of government units and water supply agencies.
- Designating a source water protection area for each water supply source based on the state's defined source water area.
- Identifying potential contaminant sources within each source water protection area.
- Utilizing management approaches for protection of source water, including but not limited to education and regulatory approaches.
- Creating contingency plans for public water supply sources including the location of alternate drinking water sources.
- Assuring proper siting on new water sources to minimize potential contamination.
- Encouraging public participation.

This guidance document is intended to assist communities with surface water systems in developing an approvable SWIPP. Communities may add other items as appropriate, and are encouraged to submit a work plan for review before proceeding with development of their SWIPP.

Program Elements

Basic information about the water supply system and community

_Community location and population
_Present service area (geographic area and population served)
_System capacity
_Local program goals for SWIPP

Defining roles and duties of government units and water supply agencies

_Identification of all people, local, county, or state agencies, or public water supply agencies that have significant responsibilities for carrying out the local SWIPP
_Brief description of the roles and responsibilities for each person or agency
_Intergovernmental agreements, memoranda, or ordinances which set forth procedures or responsibilities related to SWIPP
_Agency, person and/or team responsible for the periodic update of the local SWIPP
_Schedule for quarterly meetings of SWIPP team

Designating a source water protection area for each water supply source based on the state's defined source water area

_Map that shows or describes the area that contributes water to your source. This is described in your source water assessment that was completed by the state. This will be very site specific and may be very general for some systems. i.e. a Great Lake source extending far into the lake versus an inland river intake with a defined watershed (Use of a U.S. Geological Survey quadrangle map as a base is recommended).
_Small watershed boundaries and/or surface water runoff patterns, if appropriate for SWIPP
_Storm water drainage system and facilities, including storm water basins if relevant to the SWIPP

Identifying potential sources of contamination within the SWP area

NOTE: This will take some judgment since there may be numerous potential contamination sources. It may be necessary to describe them both specifically for significant ones and generally for those that are relatively common. For example; there are numerous underground tanks, but fewer large industrial complexes.

_Record searches to identify potential sources of contamination and land uses that have a potential to impact the surface water source
_General surveys to identify potential sources of contamination and land uses that have a potential to impact the surface water source

_Record searches to identify historical land uses that have a potential

to impact the surface water source

_Map which displays potential sources of contamination within the SWIPP

_Description of the process used to identify potential sources of contamination, including the sources of information

_Comprehensive listing of potential sources of contamination within the SWIPP area

Utilizing management approaches for protection of source water, including but not limited to education and regulatory approaches

_Description of the local management program for SWIPP. Examples of local management program elements include:

- Zoning ordinance provisions for SWIPP
- Facility inspection or hazardous material survey program
- Information to businesses concerning state and county requirements
- Environmental permits checklist for new businesses
- Strategic monitoring within the SWIPP area
- Inter-agency coordination and communication
- Other SWIPP elements developed by the local agency
- Identification of partnerships or agreements with county or state agencies which will help implement the local SWIPP
- Development and implementation of best management practices that reduce the risk of surface water contamination
- On-site inspections for the purpose of improving facility management of potential sources of contamination
- Incorporation of SWIPP into a municipality's master plan or other regional land use planning program

_Timetable for management plan implementation

Creating contingency plans for public water supply sources including the location of alternative drinking water sources

_Plans for how the community would deal with a major threat to the intake.

_Response protocol in the event of a hazardous substance spill or other emergency

_Emergency water supplies (bottled, bulk, etc.)

_Policies and procedures related to water supply replacement

Assuring proper siting of new water sources to minimize potential contamination

_General procedure that would be employed if a new source was developed
_Proposed method for incorporating new sources into SWIPP

Encouraging public participation

_Description of the methods used to involve and educate the public during the SWIPP planning and implementation process. Examples include:

- Local meetings
- Newsletters
- Newspaper articles
- School presentations
- Brochures
- Website
- SWP signage
- Hazardous waste collection activities
- Other_____

This is general guidance and each program will be site specific. It is suggested the community develop a draft outline for review before any detailed SWIPP is developed.

Appendix E

GLWA Annual Outreach Reports, 2016-2019

GREAT LAKES WATER AUTHORITY

SURFACE WATER INTAKE PROTECTION PROGRAMS PUBLIC EDUCATION ACTIVITIES REPORT

2016

PREPARED BY:
GLWA CUSTOMER OUTREACH
PUBLIC EDUCATION WORK GROUP

GLWA
Great Lakes Water Authority

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Background

The Great Lakes Water Authority's (GLWA) Surface Water Intake Protection Programs (SWIPPs) for the Belle Isle, Lake Huron and Fighting Island intakes were approved by the Michigan Department of Environmental Quality (MDEQ) in early 2016. The SWIPPs build on the past source water assessment programs that have been in effect since 2004 and include additional protection efforts. Public education was identified as a key component of the SWIPPs since individual actions impact surface water quality and ultimately our sources of drinking water. Recognizing the opportunities available within the GLWA's customer outreach program to address SWIPP public education topics with customers, the plans called for semi-annual discussion of SWIPP topics at Public Education Work Group meetings. The Public Education Work Group welcomed the opportunity to support this effort and made significant strides during 2016 by developing SWIPP education messages, writing articles and creating social media posts. This report summarizes the efforts undertaken during 2016.

Activities undertaken and summarized in this report include:

- Discussions at five Public Education Work Group meetings
- Publication of three articles and a brochure on the customer outreach portal
- Seven social media posts through GLWA Facebook and Twitter

Discussions at Public Education Work Group Meetings

The Public Education Work Group met six times during 2016. SWIPP discussions began at the second meeting in March and took place at each of the following meetings. Excerpts from the meeting summaries follow showing the progression of learning about the SWIPPs to development of messages and delivery of those messages in articles and social media posts.

March 15, 2016 Meeting Discussion

Mary Lynn Semegen gave the group an overview of the Surface Water Intake Protection Programs (SWIPPs). SWIPPs have been prepared for the two Detroit River intakes and Lake Huron intake and are currently under review. The SWIPPs build on the Source Water Assessment Programs (SWAPs) that were undertaken in 2004.

The Great Lakes represent 21% of the world's fresh water. GLWA supplies water to 3.5 million people in southeast Michigan and over 10% of the people living in the Great Lakes watershed. The SWIPPs outline the roles of government units and water supply agencies in managing the intakes and responding to emergencies. Source water protection areas were delineated for each intake and contaminant source inventories conducted. Management strategies, contingency plans and emergency response protocols were identified. The need for public participation outreach was also identified. Examples of public outreach activities that can be incorporated into the SWIPP include:

- GLWA public outreach activities through the portal, Source Water Intake Teams and GLWA TAC
- City of Detroit Stormwater Program including green infrastructures, IDEP and reporting hotline, and hazardous and compost waste collections
- SEMCOG public education efforts
- Non-Governmental Organizations (NGOs)

The SWIPP grant is renewable and can be used for identifying priority site inspections, developing partnerships between municipalities, and outreach activities that raise public awareness in matters pertaining to source water. Eligible outreach activities include:

- Development, production and circulation of educational materials

- Media announcements, newspaper articles and radio announcements
- Signing activities that identify an approved source water protection area or promote protection including storm drain stenciling and road signs
- Development and implementation of school curriculum related to source water protection and a strategy to educate the public on issues related to source water protection

It was noted that the MDEQ has a sister program to SWIPP for groundwater sources called the Wellhead Protection Program.

Getting the message out to the public was discussed. It was noted that children and schools are a good way to carry environmental messages back to adults. This has been successful with education about recycling. Ways to get messages to students should be incorporated into outreach efforts as they are developed.

There are two types of SWIPP messaging that need to occur:
- Messaging about actions individuals can undertake to protect water quality in their watershed
- Messaging about the SWIPPs and our source water

Many watershed protection action messages have already been developed and are in use by SEMCOG, watershed councils and other organizations. These messages do not need to be reinvented but a clearer link to surface water and drinking water needs to be developed. Messages used in the SEMCOG small brochure series on landscaping, lawn care, storm drains, car care, pet care and household hazardous waste were shared with the group. It was noted that MSU Extension Services could be a good source of information for messaging about proper care of septic tanks. It was noted the septic tank risk pertains to the Lake Huron intake. The message to not flush prescription drugs can be carried through materials that educate people about other things not to flush like wipes. It was noted that the Cranbrook Institute of Science has developed a curriculum around the Michigan Grade Level Content Expectations for Benchmarks for Science and Social Studies.

Potential messaging surrounding the SWIPPs includes:
- The Detroit River and Lake Huron provide the source water that is treated by the Great Lakes Water Authority and used as drinking water for nearly 4 million people (or 127 communities).
- The Great Lakes Water Authority's Surface Water Intake Protection Programs (SWIPPs) use a collaborative approach to protect three intakes that supply source water to water treatment plants.
- Coordinated protection and response efforts between GLWA, governmental units, watershed groups and Canadian agencies are critical to surface water protection.
- Stormwater runoff can harm the environment and negatively impact our source of drinking water.
- Actions by residents and businesses to prevent contaminants from coming in contact with stormwater help protect our surface waters and sources of drinking water. [Promote specific action messages.]
- Southeast Michigan streams and rivers drain to the Great Lakes system – everyone's actions matter.

The Public Education Work Group will further discuss and refine these messages at the May meeting. Initially, the work group can assist with SWIPP outreach in the following ways:
- News articles about the SWIPPs and references to the SWIPPs in Operation Clean Water articles where appropriate (e.g. Safeguarding our Drinking Water)

- Make the connection that surface water is our source of drinking water in watershed protection messaging (e.g. green infrastructure news item)
- Incorporate watershed protection and SWIPP messages into social media posts

While on this topic, it was noted that SEMCOG is developing a Water Resources Plan over an 18-month period and that there will be some overlap with the Wastewater Master Plan.

May 17, 2016 Meeting Discussion

The source water protection messaging developed at the last meeting was further defined as follows:

(1) The Detroit River and Lake Huron provide the source water that is treated by the Great Lakes Water Authority and used as drinking water for nearly 4 million people (or 127 communities).
(2) Stormwater runoff can harm the environment and negatively impact our source of drinking water.
(3) Actions by residents and businesses to prevent contaminants from coming in contact with stormwater help protect our surface waters and sources of drinking water. [Promote specific action messages.]
(4) The Great Lakes Water Authority actively monitors and works with other governmental units, watershed groups and Canadian agencies to enhance protection around intakes.
(5) Streams and rivers drain to the Great Lakes system – everyone's actions matter.

There was discussion surrounding whether the "everyone's actions matter" message should be the first message instead of last message. The idea of using the shared responsibility theme here was also suggested – Watershed protection is a shared responsibility.

Social media can be used to communicate these messages to the general public as a starting point for public education to support the SWIPPs. The following social media posts related to the first message were developed:

- The #DetroitRiver and #LakeHuron provide the source water that is treated by us and used as #drinkingwater for nearly 4 million people.
- The #GreatLakes are a shared resource supplying 40 million people with #drinkingwater.
- The #GreatLakes are the largest surface #freshwater system on the Earth.

Everyone liked the idea of generating posts. Posts will be developed for the other messages for further discussion at the next meeting. We might want to develop a diagram of watershed/source water protection activities. It was noted that the SEMCOG tip cards have been updated recently and are a good resource to use. The idea of using #ONEWater as a hashtag was suggested.

We will also look for ways to incorporate these messages, as appropriate, into Operation Clean Water articles.

July 19, 2016 Meeting Discussion

At the last meeting, the group discussed creating social media posts to kick off some of the SWIPP messaging with the understanding that the group would develop news articles and other materials in the future. The group discussed posts that were drafted around main messages discussed at the last meeting. The following suggestions were made:

- Use the tagline "Our actions impact our drinking water" in the colored bar that is part of each photo.
- Change the second message to: Contaminants in storm water runoff can harm the environment and potentially impact our source of drinking water. The post is okay as written.

- Add a message and posts about pharmaceuticals and personal care products.
- The #ONEwater hashtag is good to use.

The posts will be documented so that they can be included in a report to MDEQ on SWIPP outreach if needed.

While on this topic, it was noted that the next Operation Clean Water article will be a 2-page article on pharmaceuticals and personal care products with the main message that managing these impacts begins at home with proper disposal and not using products that can be harmful to our source water. Bill Creal, will be starting with GLWA soon, and will be interviewed as a subject matter expert (SME) for the article.

September 22, 2016 Meeting Discussion
The SWIPP posts were modified per discussion at the last meeting. The updated posts were reviewed with the following comments:

- GLWA has not started using the #ONEwater hashtag yet. Everyone likes it and agrees this is a good application for it.
- In Post 3, the second use of "runoff" should be changed to "run off".
- In Post 5, consider changing "tub and tile cleaners" to "cleaning products".
- In Post 6, add "of" before pet waste

The posts will be sent to GLWA to program into the calendar of posts. Use of the #ONEwater hashtag was recommended so it looks like it is part of a campaign. Posts will be tracked for reporting to MDEQ on SWIPP education.

The article on pharmaceuticals and personal care products was discussed. Mary Lynn Semegen and Bill Creal will be interviewed and quoted in the article. The following article messages were agreed upon:

- The high use of pharmaceutical drugs and personal care products in our society creates the potential for these substances to impact our environment including water supplies.
- Wastewater treatment plants were not designed to remove the contaminants being used in PPCPs today.
- Proper disposal of pharmaceuticals is required to prevent these drugs from getting into our sources of drinking water.
- The federal government has taken action to ban some harmful chemicals used in personal care products.
- USEPA requires water utilities to monitor for emerging contaminants in drinking water under the Unregulated Contaminant Monitoring Rule (UCMR) including some chemicals used in pharmaceutical drugs.
- GLWA participates in research studies with national water research organizations and Wayne State University to support PPCP research and the improvement of water treatment techniques.

The article should be easy to write. Once it is completed, we will develop a small brochure on the topic similar to what we have done for FOG and wipes. Social media posts will also be created at this time.

November 16, 2016 Meeting Discussion

The *Changing Personal Care Habits to Protect our Drinking Water* article has been reviewed by Mary Lynn Semegen and Bill Creal of GLWA and is ready to be posted. The brochure was distributed to the group for review. It was noted that we should also distribute the brochure to County Health Departments upstream of the GLWA service area. The MDEQ asked GLWA to extend SWIPP education to this area. We will discuss this further at the January meeting.

It was reported that 7 of the 9 SWIPP posts have been posted on GLWA social media. A summary documenting 2016 activities on SWIPP communications completed through the work group will be prepared and forwarded to Mary Lynn for future reporting to MDEQ.

Potential SWIPP topics to prepare articles on were identified as follows:

- Green infrastructure projects – Doing more than controlling quantity of storm water runoff. Projects in customer communities.
- How do everyday actions impact source water?
- Lawn care, car care, environmentally-conscious purchase decisions, proper disposal of drugs, cleaners, etc., and care of septic tanks

Publication of Articles and Brochure on the Customer Outreach Portal

The Public Education Work Group publishes 1- to 4-page articles on topics of interest to wholesale customers about how GLWA and its suburban wholesale customers manage our water and sewer infrastructure to protect public health and the environment. These articles are published under the *Operation Clean Water* masthead, and emailed to wholesale customers, environmental groups and the media. They are also posted on the outreach portal at outreach.glwater.org. Some articles are sent to MWEA and AWWA Michigan for inclusion in their publications.

Three articles related to SWIPP topics were published:

- *SWIPPs to Enhance Protection of Our Drinking Water*. Posted to the portal and emailed on April 12, 2016, this 2-page article provided an overview of the SWIPPs and roles of the Public Education Work Group
- *Safeguarding Our Drinking Water Quality*. Posted to the portal and emailed on July 22, 2016, this 4-page article detailed how water quality is safeguarded from the source to consumer service lines. The SWIPPs are referenced. This article was also published in the Summer 2016 issue of MWEA Matters, the quarterly magazine of the Michigan Water Environment Association.
- *Changing Personal Care Habits to Protect Our Drinking Water*. Posted to the portal and emailed on November 17, 2016, this 2-page article talked about how pharmaceuticals and personal care products (PPCPs) can impact our waterways and the need for proper disposal to protect our drinking water sources.

These articles are included in Attachment A. The article on PPCPs was also used to develop a tri-fold brochure that can be printed and used within and outside the GLWA service area as shown in Attachment B. During 2017, the Public Education Work Group will encourage GLWA wholesale customers and adjacent communities to use the brochure in their communities.

Social Media Posts Through GLWA Facebook and Twitter

The Public Education Work Group collaborated on social media posts and came up with the “Our actions impact our drinking water” tagline to use with photos in posts. Seven posts were created as a series of posts about actions that impact drinking water. Four additional posts related to the SWIPP topics featured in the published *Operation Clean Water* articles were created. All posts are shown in Attachment C.

ATTACHMENT A

ARTICLES RELATED TO SWIPP TOPICS

GLWA
Great Lakes Water Authority

SWIPPs to Enhance Protection of Our Drinking Water

Operation Clean Water

High quality drinking water is a priority for the Great Lakes Water Authority (GLWA). Recognizing that quality begins with the source water used to produce our drinking water, GLWA has embarked on new efforts for continued protection of this valued resource. Surface Water Intake Protection Programs (SWIPPs) were developed for each of the three intakes in the Detroit River and Lake Huron that supply GLWA's water treatment plants. These programs were approved by the Michigan Department of Environmental Quality (MDEQ) in March.

"The SWIPPs represent GLWA's commitment to continued protection of the surface waters that feed the three intakes," explains Mary Lynn Semegen, Water Quality Manager for GLWA. "It is a voluntary program that is an extension of the Source Water Assessment Programs previously conducted by the state."

Each SWIPP enhances intake protection through emergency preparedness, water quality monitoring and public education. GLWA collaborated with wholesale customers and watershed groups to develop the programs. These same groups are implementing the initial SWIPPs and will continually update and refine them.

The two Detroit River intakes are located in urbanized areas with influences from the U.S. and Canadian sides. While these intakes were designed to reduce the impacts of shoreline pollution, protection from spills and land-based contaminants including stormwater runoff is imperative. The Lake Huron intake is located in a more pristine area but requires protection from agricultural and stormwater runoff.

Emergency preparedness is being strengthened in a variety of ways. The roles and duties of local units of government and water supply agencies are clearly defined in the SWIPPs and intake teams were created to manage the source water protection approaches. Source water protection areas were delineated for each intake and contaminant source inventories conducted that will be updated each year. All of this information is kept in a comprehensive Communication Plan that is updated by the intake team each year. Regular cross-agency coordination meetings and emergency response training exercises will be undertaken. Contingency plans were also developed for alternate water supplies.

"The Ontario Ministry of Environment and Climate Change has been part of the SWIPP development process for the two Detroit intakes," continues Semegen. "Ontario also has two water intakes along the Detroit River corridor. It's important that we work together on planning and emergency response."

On the U.S. side, many groups participated in program development. Staff from throughout the GLWA, Detroit Fire Department, Wayne County Department of Public Health, Oakland County Water Resources Commissioner's Office, South Oakland County Water Authority, City of Dearborn, Clinton River Watershed Council, and Friends of the Rouge collaborated to create the SWIPPs.

GLWA draws water from the Detroit River and Lake Huron to satisfy an average daily water demand of 476 million gallons. In the summer when demand increases, the volume of water used each day can reach 732 million gallons. Continued protection of these waters and the Great Lakes is vital to the region.

GLWA performs monitoring at the intakes beyond the Safe Drinking Water Act (SDWA) regulatory requirements. GLWA is part of the Huron to Erie monitoring network. Many surface water intake utilities along this corridor participate in the water quality monitoring network. The network serves most water intakes from Lake Huron to Lake Erie, a commercial shipping corridor route between the upper and lower Great Lakes. As part of the SWIPP recommendations, additional monitoring equipment will be added to enhance water quality protection at the Detroit River and Lake Huron intakes.

Public education through a variety of existing mechanisms will be used to increase public awareness and understanding of the need to safeguard our surface water. “We have to make people aware that what they put down their storm drains goes into the same body of water that supplies our drinking water,” continues Semegen. “GLWA needs assistance from our customer communities in delivering this message.”

The GLWA Customer Outreach Public Education Work Group, comprised of GLWA staff and wholesale customers, will assist with the efforts. Protection of our surface waters through watershed-based education ties in with activities the group already has underway. The group will reach out to wholesale customers to help deliver educational messages in their communities. Collaboration will also be undertaken with watershed councils, the Southeast Michigan Council of Governments (SEMCOG) and other groups promoting watershed protection.

Watershed protection education focuses on promoting actions by residents and businesses to prevent contaminants from coming in contact with stormwater that runs off land into our surface water. This includes activities like limiting the use of fertilizers and pesticides, landscaping to reduce stormwater runoff from your residence, properly disposing of household hazardous waste, and cleaning up pet waste.

The SWIPPs were developed with a grant provided by the MDEQ. Additional grants can be pursued to support future SWIPP implementation activities and public education.

The voluntary SWIPP for each of GLWA’s water intakes provides another layer of protection in our water supply as drinking water is conveyed from its original source in the Detroit River or Lake Huron, through the treatment and distribution process to our taps.

GLWA is committed to water quality throughout its operations. A Water Quality Work Group was just created to focus on supporting consistent system-wide approaches to ensure quality water to all the communities served by the GLWA system.

“Quality has been, and always will be, the priority goal of the Great Lakes Water Authority,” says Sue McCormick, GLWA Chief Executive Officer.

April 12, 2016

Operation Clean Water features articles on how GLWA and its suburban wholesale customers manage our water and sewer infrastructure to protect public health and the environment. It was created by the GLWA Customer Outreach Public Education Work Group that includes individuals from wholesale customers (Macomb, Oakland and Wayne Counties and DWSD), GLWA, MDEQ, SEMCOG and consultants. Operation Clean Water is published on the GLWA Customer Outreach Portal at outreach.glwater.org.

Operation Clean Water

Safeguarding Our Drinking Water Quality

Operation Clean Water

Delivering water that meets Safe Drinking Water Act requirements is a commitment that the Great Lakes Water Authority (GLWA) and its customer communities take very seriously. Adherence to water treatment standards is a daily routine achieved by meeting stringent GLWA and community internal standards that raise the bar on water quality. After water leaves the treatment plants, quality is protected in the distribution system through best practices that limit the potential for cross contamination and keep fresh drinking water moving through mains to customer service lines.

The GLWA provides drinking water to 126 communities and nearly 4 million people. Servicing a system this large is a team effort, with local communities picking up responsibility at master meters where the GLWA transmission network feeds their systems. While the system infrastructure has many owners, it works seamlessly each day to meet local demand, provide adequate pressure, protect public health and provide fire protection.

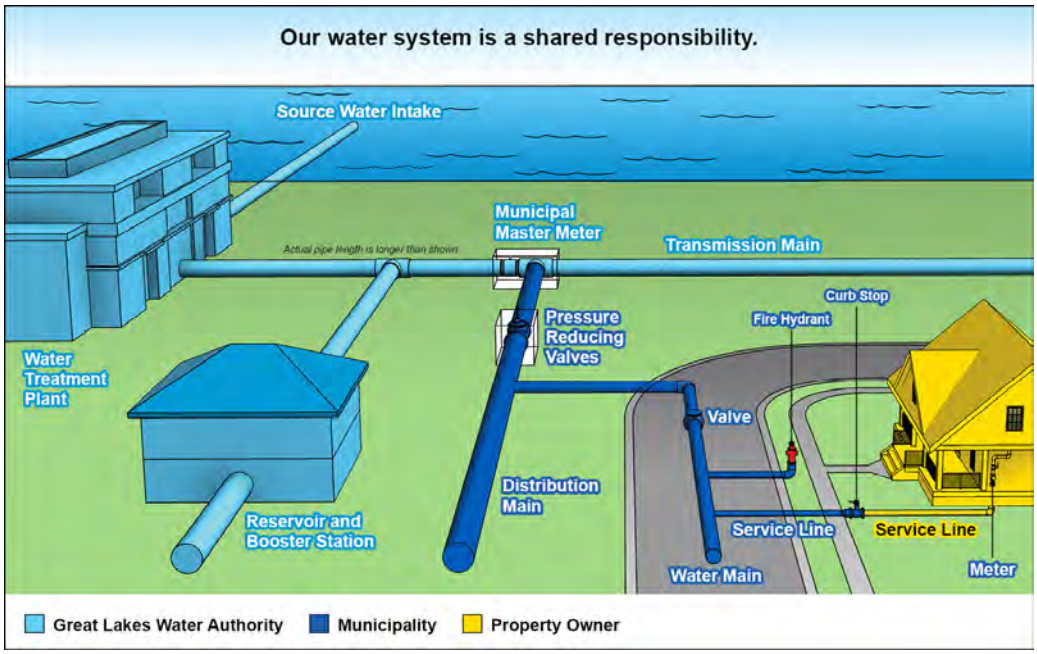
Shared Responsibility for the Water System

The GLWA operates 5 large water treatment plants that receive source water from 3 intakes in the Detroit River and Lake Huron. A regional transmission system extends to each wholesale customer, delivering water to 290 municipal master meters. Each community operates their system of distribution mains that carry water to consumer service lines.

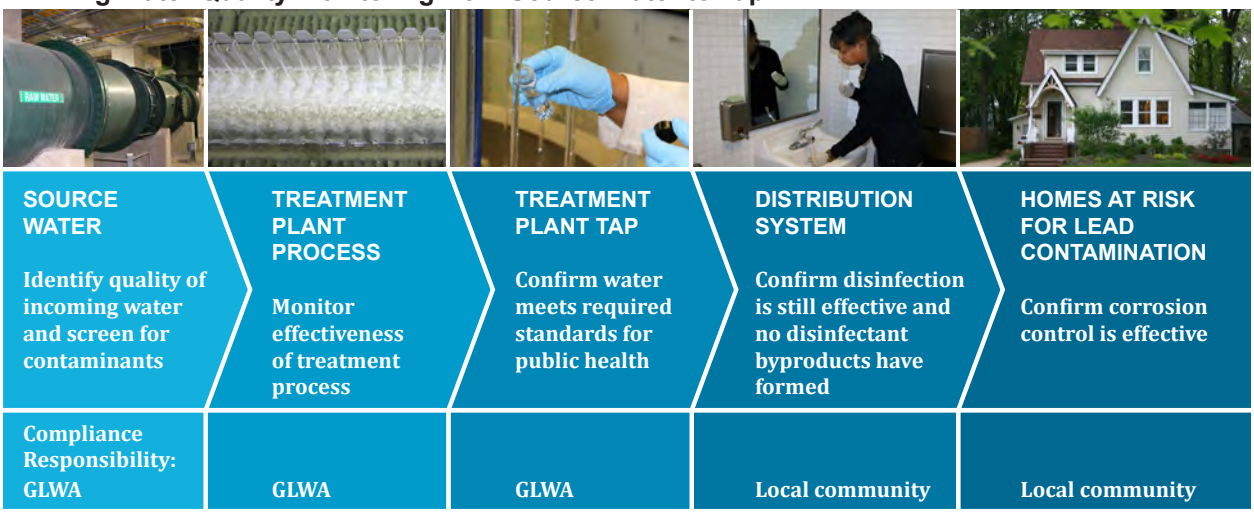
The regional transmission and local distribution systems are heavily interconnected, operating as a single system with shared responsibility for water quality. GLWA manages the treatment process, booster stations, storage reservoirs and large transmission mains, valves, and master meters. Each community manages their distribution mains, valves, fire hydrants, service lines, and meters, as well as local storage facilities, pressure reducing valves and booster stations.

Because the system is extensively interconnected, many contaminants are monitored from a system-wide rather than community-specific perspective. This provides uniformity in sampling and testing procedures throughout the system. GLWA and the local communities share the monitoring duties but each community remains responsible for water quality compliance within their local system. GLWA collects and analyzes weekly residual chlorine and bacteriological samples in accordance with individual community sampling plans, and performs biannual water quality sampling to monitor corrosion control. Each community manages their lead and copper sampling program and GLWA analyzes the samples. Communities also perform quarterly disinfection byproducts monitoring.

Our regional transmission and local water distribution systems operate as a single, large system to deliver treated drinking water to consumer taps. Protecting water quality along the way is a responsibility shared between GLWA, customer communities and property owners.



Drinking Water Quality Monitoring from Source Water to Tap



Protection of public health is the focus of water quality monitoring throughout the treatment and distribution process. Testing differs at each point based on potential contaminants that could be present.

Role of SDWA in Safeguarding our Water

The Safe Drinking Water Act, or SDWA, was passed in 1974 to protect public health through oversight of the treatment and distribution of potable water. Significant amendments were passed in 1986, 1996 and 2005 requiring achievement of lower maximum contaminant levels (MCL) for certain contaminants and additional requirements.

"The SDWA establishes requirements for treatment processes, analytical testing, operator certifications, operational reporting, and frequency of inspection and monitoring," explains Cheryl Porter, Chief Operating Officer for GLWA. "These are the minimum requirements that GLWA and local communities must follow."

The SDWA requires monitoring at 5 points in the water system to address specific water quality concerns that could occur as water moves through the treatment and distribution process. The frequency of sampling differs at each point with the most intense monitoring undertaken during the treatment process where continuous monitoring occurs for some parameters.

Specific SDWA rules outline the water quality monitoring requirements. Some rules apply to all public systems such as the Total Coliform Rule and Lead and Copper Rule. Other rules are specific to the type of source water used like the Surface Water Treatment Rule, and the treatment process used like the Disinfectants/Disinfection Byproducts Rule.

"Over 90 contaminants have to be monitored throughout the treatment and distribution process. Each contaminant has a specific frequency, sampling procedure and analytical method," continues Porter. "As technology and science change, rules are amended to account for this."

"There are also requirements for the physical condition of facilities. Water storage reservoirs must be dewatered and evaluated every 5 years to make sure they are still structurally sound," explains Porter.

The SDWA identifies public notification and education standards including the annual Water Quality Report communities must prepare. The state of Michigan oversees compliance and has the power to adopt even more stringent standards when appropriate.

Adopting Higher Standards in Water Quality

"Some of GLWA's internal treatment standards are more stringent than the SDWA standards," concludes Porter. "For example, turbidity, a critical measurement of contamination, has an internal standard of 0.1 NTU when the SDWA standard is 0.3 NTU."

"We also monitor fluoride and orthophosphate more frequently than the 24-hour SDWA requirement. GLWA monitors every 8 hours so each shift's operators are aware of the levels and can make an adjustment if needed," adds Porter. Dosing these chemicals used to prevent tooth decay and corrosion in lead and copper pipes at the correct levels is critical.

"We look at the SDWA regulations as providing the minimum threshold of what we need to achieve," affirms Sue McCormick, Chief Executive Officer for GLWA. "We optimize the treatment process at each plant to provide the safest level of water possible."

"For years, we have required every single one of our operators to hold an operator's license with the state rather than just the supervisor in charge," continues McCormick. "We want operators to understand their water quality responsibility and how the treatment process impacts that. We don't want operators to perform their job by rote."

Source Water Monitoring and Protection
The Detroit River and Lake Huron provide exceptional source water but still require detailed monitoring. Seasonal changes can create variations in water quality. Physical and chemical properties of the raw water are tested to guide the treatment process. Measures like turbidity, alkalinity, hardness and pH can impact the flocculation, sedimentation and filtration treatment processes. Raw water is also tested for total coliforms, *E. coli* bacteria and other harmful microorganisms and toxins.

"We monitor for variations of UV254 organics in raw water to optimize the treatment process," explains Pawan Kapila, Operations Lead of GLWA's Southwest Water Treatment Plant. "The higher the UV254 number, the higher the dosage of alum needed."

"Algal blooms also have dramatic effects on water chemistry, most notably pH," adds Kapila. "Due to increased light and temperature in the summer, algae in source water remove carbon dioxide from water during photosynthesis, raise the pH of water, and may adversely affect the treatment process."

GLWA is part of the Erie to Huron Network that shares water quality data with other public water treatment plants. "Each plant has a probe that is monitoring raw water quality and sending data back to the network," explains Mary Lynn Semegen, Water Quality Manager for GLWA. "The network serves as an early warning system in the event of a chemical spill along the commercial shipping corridor between the Upper and Lower Great Lakes."

"Understanding potential contamination threats, having an action plan to respond to those threats, and educating the public on their role in source water protection is also critical," adds Semegen. "GLWA has created Surface Water Intake Protection Programs, or SWIPPs, for our three intakes that focus on these protection aspects."

Achieving Treatment Standards
Water treatment is a physical process aided by chemicals. In the first stage, screening is used to remove any debris. Next, chlorine and alum are added. The chlorine kills bacteria and other microorganisms. Alum is used to initiate the flocculation process where particles are attracted to each other to form larger particles that settle out. The settled water then moves through filters to remove the remaining smallest particles. Additional chlorine is added to maintain a chlorine residual level within the distribution system ensuring bacterial growth does not occur between the treatment plant and water consumers' service. In the final stage, orthophosphate is added for corrosion control and fluoride is added for protection against dental decay.

The most intense water quality monitoring takes place during the treatment process. Test results are used to guide the treatment process and ensure standards are met before water enters the distribution system.

Water quality is safeguarded through operational practices like continuously removing sludge from settling basins and filter backwashing practices. Filters are backwashed, or cleaned, more frequently when turbidity rises.

The three main measures used to monitor the effectiveness of the treatment process are turbidity, total coliforms and *E. coli*. Turbidity is monitored at each treatment stage while total coliforms and *E. coli* bacteria are monitored in the incoming water and water entering the distribution system.

Chlorine is also important and must be kept within a certain threshold to avoid over disinfection that can create harmful byproducts. "Each water treatment plant has a threshold for chlorine that it must maintain," Kapila explains. "This minimum limit is maintained based on study requirements calculated for each plant using the worst case scenarios."

More than 300 monitoring readings and tests are performed daily by chemists at each water treatment plant as part of the routine monitoring of the treatment process. Additional testing is also performed by GLWA's Water Quality Group for the different cycles of SDWA compliance and non-compliance monitoring. This includes testing for numerous other contaminants weekly, monthly, quarterly, annually, triennially and at other infrequent intervals. The Water Quality Work Group performs more than 50,000 analyses yearly.

The SDWA also requires testing for contaminants that may be regulated in the future. Recently, the USEPA required monitoring for contaminants such as hormones, metals and perfluorinated compounds not currently regulated to gain an understanding of their presence and potential public

health impact in systems across the country. The insights gained from this monitoring form the basis for the need for and content of future regulations.

Keeping Water Fresh in the Distribution System
Once water enters the distribution system, quality is managed through operational practices and monitored weekly in each community. “Good movement and flow of water is needed to maintain water quality,” explains Jim Taylor, Director of the Department of Public Services for Van Buren Township. “We flush the system annually in the spring to make sure it is clean and fresh. Water can age in the system during winter when people use less water.”

The GLWA Systems Control Center monitors system pressure and is in constant contact with the treatment plants. If demand is down in an area, less water will be treated and vice versa. This keeps fresh water feeding into the distribution system.

Each community is required to have a primary operator and a backup certified distribution system operator to manage maintenance and construction activities. Procedures are followed for new connections and disconnections along with water main repairs to ensure water safety is maintained. “Water quality safety is really blended into our operations,” continues Taylor.

Cross connection programs that monitor backflow preventers are also important. These devices keep water outside the distribution system from making its way back into the system. “In Van Buren, we have more than 800 backflow preventers that are inspected as part of our cross connection program,” continues Taylor. “More than half of these are considered higher risk devices and are inspected annually.”

Flushing a water system after periods of lower use brings fresh water into the system to help maintain water quality.

GLWA works with Van Buren and other communities to complete required water quality monitoring in the local distribution system. Following a sampling plan created by Van Buren, GLWA performs weekly bacteriological sampling. Van Buren performs quarterly testing to ensure disinfection byproducts have not formed as a result of the disinfection process. Local communities also perform other SDWA distribution system testing as required like the recent Unregulated Contaminants Monitoring Rule 3 testing.

Preserving Water Quality in the Home
The last leg of the journey for drinking water, through service lines and residential plumbing, can impact water quality. Homes and apartment buildings with lead service lines, goosenecks, lead solder or plumbing fixtures containing lead are at risk for lead leaching into water. While GLWA has an optimized corrosion control program, lead can leach from pipes and plumbing fixtures when water sits in it for extended periods of time.

Lead and copper sampling is the only SDWA requirement that is monitored at the consumer’s tap since the potential source of contamination is in the service line or inside the building. GLWA’s customer communities are required to conduct lead and copper sampling and to take action if tests exceed the action levels. GLWA performs the analytical testing to support these efforts.

Recognizing the need for public education in this area and further customer collaboration, a Water Quality Work Group was recently formed as part of GLWA’s customer outreach effort. The group’s primary focus is supporting consistent system-wide approaches that minimize lead exposure within the communities serviced by the GLWA system. The group recently published educational materials to inform people in the GLWA service area how to best protect themselves and their families from potential sources of lead in home piping and plumbing fixtures.

“The work group shares a passion for water quality and is collaborating on this important issue to assure residents throughout the GLWA system that they will continue to receive safe, reliable and quality water,” concludes GLWA’s McCormick.

Operation Clean Water features articles on how GLWA and its suburban wholesale customers manage our water and sewer infrastructure to protect public health and the environment. It was created by the GLWA Customer Outreach Public Education Work Group that includes individuals from wholesale customers (Macomb, Oakland and Wayne Counties and DWSD), GLWA, MDEQ, SEMCOG and consultants. Operation Clean Water is published on the GLWA Customer Outreach Portal at outreach.glwater.org.

Operation Clean Water

Changing Personal Care Habits to Protect Our Drinking Water

Operation Clean Water

As personal care products evolve and we take more medications, the waste from our society changes. Today's waste includes ingredients from soap, like microbeads and anti-bacterial agents, and trace amounts of prescription drugs. These waste byproducts are showing up in our nation's rivers and lakes in low levels. While public health has not been impacted, we need to look at how we use and dispose of these products to protect our drinking water supplies and environment.

Pharmaceuticals and personal care products, known as PPCPs, provide a daily source of contaminants to our waste stream. Wastewater treatment plants were not designed to fully remove these contaminants. Trace amounts can remain in the final effluent discharged to our waterways.

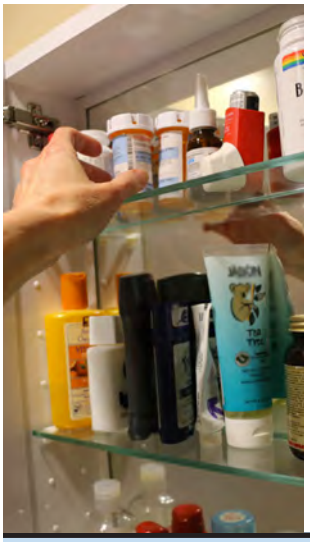
"Understanding how PPCPs impact our waterways and how to help reduce the levels of these contaminants in the environment is important," explains Mary Lynn Semegen, Water Quality Manager for the Great Lakes Water Authority (GLWA). "Everyone can help protect our waterways through proper disposal of drugs and reading labels of the products to make an informed decision before purchasing."

Widespread Use of Pharmaceuticals Increases Need for Proper Disposal

According to the Mayo Clinic, nearly 70% of Americans take at least one prescription drug. More than half of the population takes two drugs. Antibiotics, anti-depressants, painkilling opioids and drugs to lower lipids are the most commonly prescribed medications. Trace contaminants from these and other drugs get into our waterways from people excreting them, flushing them down the toilet, or washing them off their bodies.

Some pharmaceuticals contain endocrine disrupting chemicals (EDCs) that mimic or block the function of natural hormones in the body. So far, scientific evidence has not determined that trace amounts of pharmaceuticals and EDCs in drinking water have an impact on human health. Further research is needed. However, scientific studies have concluded EDCs can affect the growth and development of fish and wildlife.

Proper use and disposal of prescription and over-the-counter (OTC) drugs is crucial. The old guideline of flushing expired or unneeded drugs down the toilet is no longer valid. Follow the steps outlined in the adjacent box to limit your environmental impact.



Reduce the Ecological Footprint of Prescription and OTC Drugs

1. Limit bulk purchases. Large quantities of unused pills can accumulate and require disposal.

2. Dispose of unused prescription drugs through a National Prescription Drug Take-Back Day held at local police stations and operated through the Drug Enforcement Agency. These occur annually in the Spring and Fall. In addition, some local government agencies and pharmacies host take-back medication programs.

3. Never flush drugs down the toilet unless the label specifically tells you to do so and you can't wait until the next Take Back Day. (Some narcotic pain relievers and other controlled substances include instructions for flushing to reduce risk of illegal abuse.)

4. When disposing of prescription and OTC drugs at home, take the drugs out of the original packaging and mix them in a bag with an undesirable substance, such as coffee grounds or cat litter, and place the bag in your garbage. Use a permanent marker to cover personal information on discarded bottles.

Changes in Personal Care Product Ingredients Address Environmental Concerns

Personal care products include soap, shampoo, toothpaste, deodorant, lotion, make-up and other products. Ingredients used in these products are not regulated, but manufacturers must verify safety before products go to market. Color additives are subject to Federal Drug Administration (FDA) premarket approval and products that make therapeutic claims are treated as drugs and require approval.

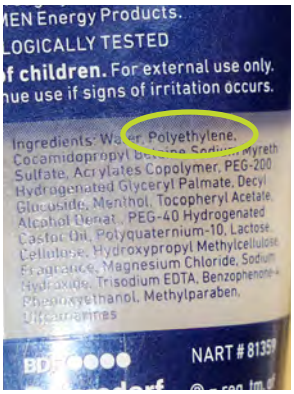
While products are safe for personal use, some ingredients have proved harmful to the environment. Microbeads and anti-bacterial agents were recently banned and are being phased out of products.

Microbeads are small plastic particles used in soaps, body washes and toothpaste for scrubbing skin and teeth. The plastic beads are too small to remove during the wastewater or water treatment processes. They have been found in waters throughout the world. Fish eat these beads which can block their digestive systems.

A new law prohibits the manufacture and use of microbeads in cosmetics over a 3-year phase-out of all products by July 2019. Some manufacturers have pledged to stop using microbeads before the deadline. Consumers can quit using microbeads by not purchasing products with polyethylene and polypropylene, the chemical ingredients of microbeads.

This fall, the FDA announced that it is banning the use of 19 antibacterial chemicals in soaps and body washes. The two most common ingredients are triclosan, used in liquid soap, and triclocarban, used in bar soap. There is no evidence to support that these ingredients are better than regular soap. Triclosan and triclocarban could act as EDCs and impact algae's ability to perform photosynthesis.

The ban becomes effective September 2017. It only applies to consumer soap products, not toothpaste or hand sanitizers. Some manufacturers started removing the chemicals before the ban in response to rising consumer demand. Since plain soap and water has been proven just as effective, consumers can start buying products that do not contain these ingredients right away. The Centers for Disease Control and Prevention (CDC) suggests using alcohol-based hand sanitizers if soap is not available.



Microbeads and anti-bacterial agents are being phased out of products. Consumers can get a head start on water protection by reading labels and purchasing products that do not contain these ingredients.

Monitoring for PPCP Contaminants in the GLWA Service Area

PPCPs and EDCs are considered to be contaminants of emerging concern (CECs) by the US Environmental Protection Agency (USEPA). CECs are chemicals and other substances that have been recently discovered in natural streams, have no regulatory standard, and are potentially harmful to aquatic life and humans. Every five years, the USEPA identifies up to 30 CECs to be monitored in public water supplies throughout the country as part of the Safe Drinking Water Act's Unregulated Contaminant Monitoring Rule.

The most recent USEPA testing occurred in 2014 and 2015 and included seven hormones found in human and veterinary pharmaceuticals. Communities within the GLWA service area that participated in the testing all found non-detectable levels of the hormones. Source water from the three intakes serving the GLWA water treatment plants also had non-detectable levels. Some other naturally occurring metals on the list of CECs were found in very low levels.

Monitoring for contaminants contributed by PPCPs will continue as part of regulatory requirements. Consumers can do their part to support stewardship of our water resources by reading personal care product labels to make environmentally-conscious purchasing decisions and properly disposing of unused medications.

November 17, 2016

Operation Clean Water features articles on how GLWA and its suburban wholesale customers manage our water and sewer infrastructure to protect public health and the environment. It was created by the GLWA Customer Outreach Public Education Work Group that includes individuals from wholesale customers (Macomb, Oakland and Wayne Counties and DWSD), GLWA, MDEQ, SEMCOG and consultants. Operation Clean Water is published on the GLWA Customer Outreach Portal at outreach.glwater.org.

Operation Clean Water

ATTACHMENT B

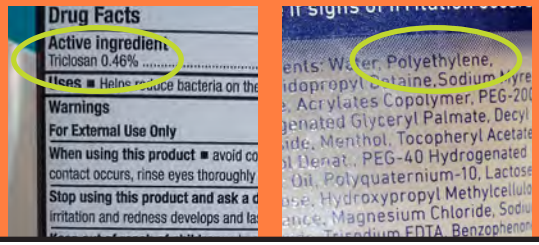
PHARMACEUTICALS AND PERSONAL CARE PRODUCTS BROCHURE

GLWA
Great Lakes Water Authority

Personal Care Products
Personal care products include soap, shampoo, toothpaste, deodorant, lotion, make-up and other products. While products are safe for personal use, some ingredients have proved harmful to the environment. Microbeads and 19 antibacterial chemicals were recently banned and are being phased out of products. Consumers can get a head start on water protection by reading labels and purchasing products without these ingredients.

Avoid Harmful Products

- Do not purchase products that contain polyethylene and polypropylene, the chemical ingredients of microbeads. These plastic beads are too small to remove during the wastewater or water treatment processes.
- Do not purchase soaps that contain triclosan or triclocarban, the two most common antibacterial ingredients. There is no evidence to support that these ingredients are better than regular soap.
- Use alcohol-based hand sanitizers if soap is not available.



The Detroit River and Lake Huron provide the source water that is treated and used as drinking water for nearly 4 million people. Our actions along the connecting rivers and lakes impact our drinking water.

Take your responsibility seriously. Don't flush drugs or use personal care products that are harmful to the environment.

December xx, 2016

https://outreach.glwater.org

GLWA Customer Outreach

DRAFT

Change Personal Care Habits to Protect Our Drinking Water

As personal care products evolve and we take more medications, the waste from our society has changed to include ingredients from soap, like microbeads and anti-bacterial agents, and trace amounts of prescription drugs. While public health has not been impacted, we need to look at how we use and dispose of these products to protect our drinking water supplies.

GLWA Customer Outreach

Pharmaceuticals and personal care products, known as PPCPs, provide a daily source of contaminants to our waste stream that wastewater treatment plants and septic tanks were not designed to fully remove. These waste byproducts are showing up in our nation's rivers and lakes in extremely low levels.

Medical Drugs

According to the Mayo Clinic, nearly 70% of Americans take at least one prescription drug. More than half of the population takes two drugs. Antibiotics, anti-depressants, painkilling opioids and drugs to lower lipids are the most commonly prescribed medications. Trace contaminants from these and other drugs get into our waterways from people excreting them, flushing them down the toilet, or washing them off their bodies.

Some pharmaceuticals contain endocrine disrupting chemicals (EDCs) that mimic or block the function of natural hormones in the body. So far, scientific evidence has not determined that trace amounts of pharmaceuticals and EDCs in drinking water have an impact on human health. Further research is needed. However, scientific studies have concluded EDCs can affect the growth and development of fish and wildlife.

Proper use and disposal of prescription and over-the-counter (OTC) drugs is crucial. The old guideline of flushing expired or unneeded drugs down the toilet is no longer valid. Dispose of drugs in the trash to reduce their ecological footprint.

Medicine cabinets should be cleaned twice a year to prevent unwanted medications from piling up. Limiting bulk purchases of medications can reduce the number of unused pills that can accumulate and require disposal. Steps to properly dispose of medications are highlighted in the adjacent box.

Proper Medication Disposal

Drug Take-Back Events

- **Dispose of unused prescription drugs through a National Prescription Drug Take-Back Day held at local police stations and operated through the Drug Enforcement Agency. These occur annually in the Spring and Fall. In addition, some local government agencies and pharmacies host drug take-back programs for prescription and OTC medications.**

- **Never flush drugs down the toilet unless the label specifically tells you to do so and you can't wait until the next Take Back Day. (Some narcotic pain relievers and other controlled substances include instructions for flushing to reduce risk of illegal abuse.)**

Home Disposal

- **Take your prescription or OTC drugs out of their original containers.**

- **Mix drugs with an undesirable substance, such as cat litter or coffee grounds.**

- **Put the mixture into a disposable container with a lid or a sealable bag and place in the trash.**

- **Use a permanent marker to cover personal information before discarding prescription drug bottles.**

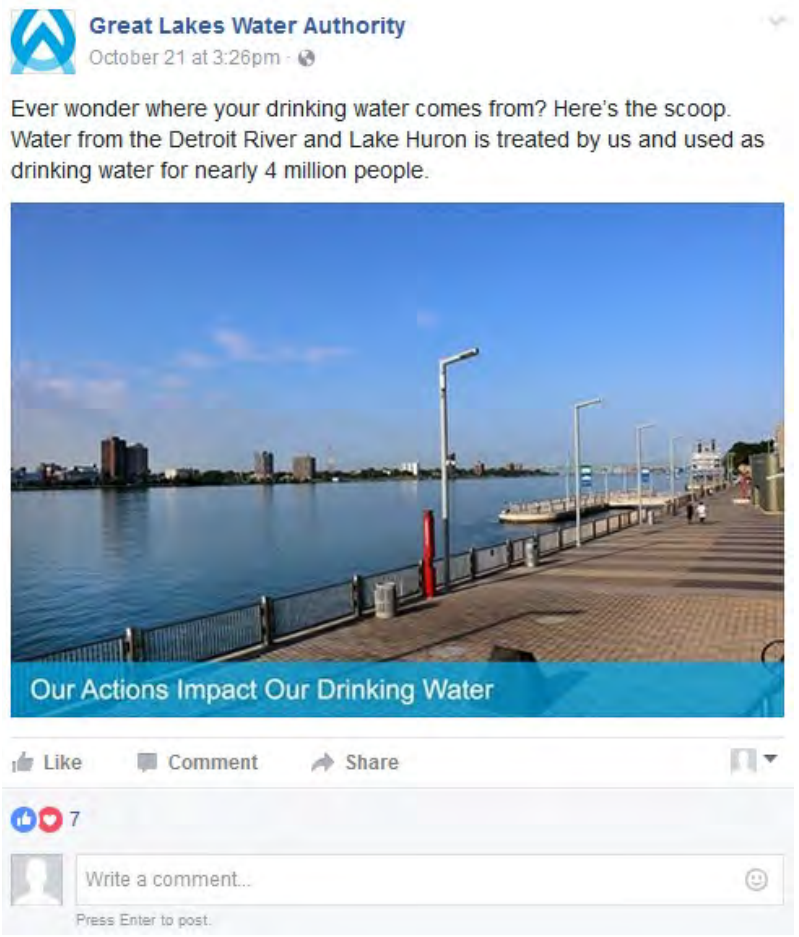
ATTACHMENT C

SOCIAL MEDIA POSTS

GLWA
Great Lakes Water Authority

Our Actions Impact Our Drinking Water Series

Post/Tweet 1



Post/Tweet 2


Great Lakes Water Authority
October 24 at 1:08pm
Michigan is a great state for many reasons. For example: The Great Lakes, the largest surface fresh water system on Earth, are a shared resource supplying 40 million people with drinking water. We're proud to deliver the nation's best water sourced from our very own lakes.
Lake Superior
Lake Huron
Lake Ontario
Lake Michigan
Lake Erie
Our Actions Impact Our Drinking Water
Like
Comment
Share
5
Write a comment...
Press Enter to post.


Great Lakes Water MI @glwatermi · Oct 24
Supplying 40 million people with drinking water, the Great Lakes are the largest surface fresh water system on Earth.
Lake Superior
Lake Huron
Lake Ontario
Lake Michigan
Lake Erie
Our Actions Impact Our Drinking Water
1
1

Post/Tweet 3

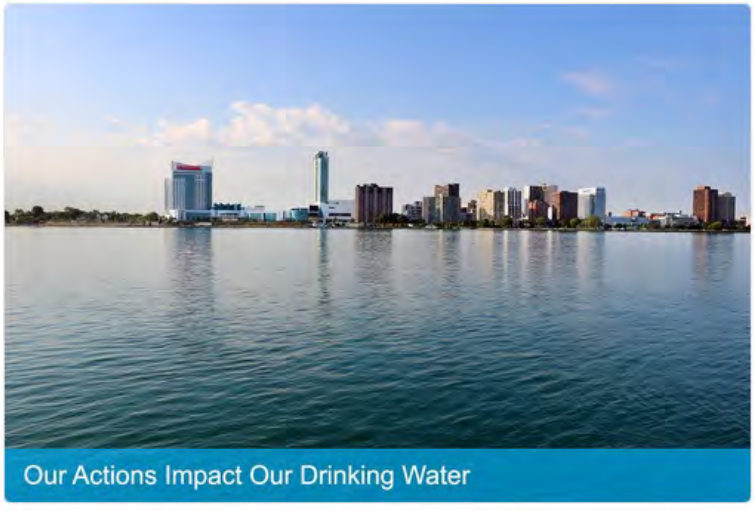
Great Lakes Water Authority
49 mins ·

It takes a village to ensure safe and quality water is delivered to homes throughout Michigan. The GLWA works with other governmental units, watershed groups and Canadian agencies to protect each surface water intake.

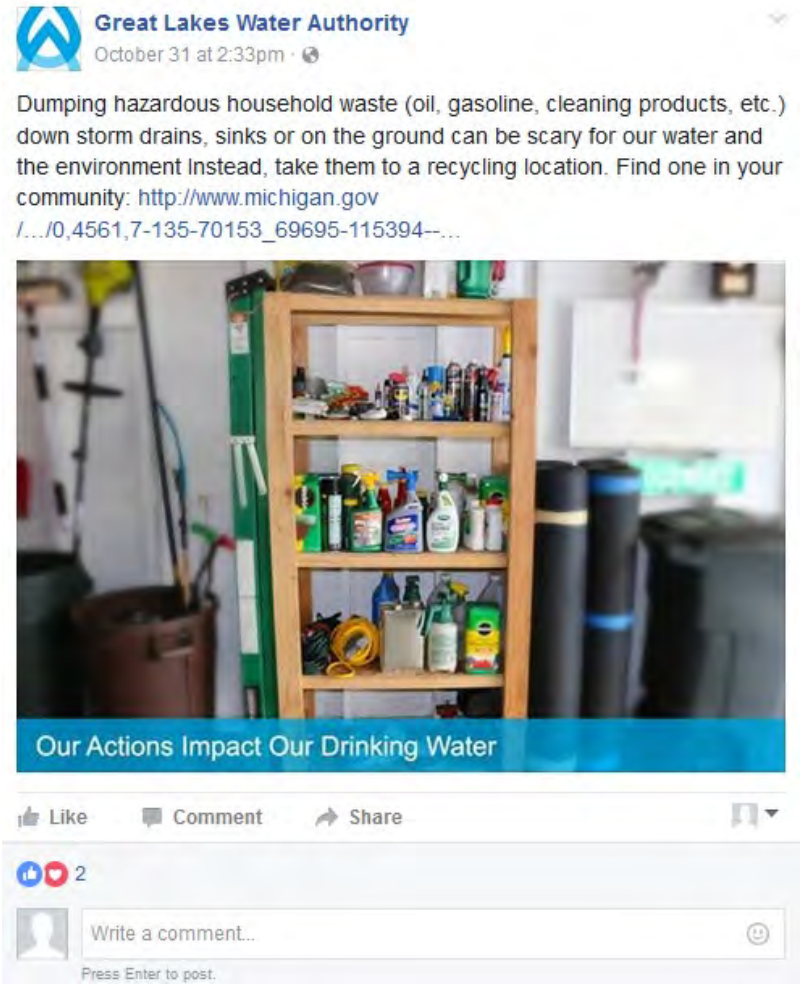
Like Comment Share

Great Lakes Water MI @glwatermi · 51m

The GLWA works with other governmental units, watershed groups and Canadian agencies to protect each surface water intake.

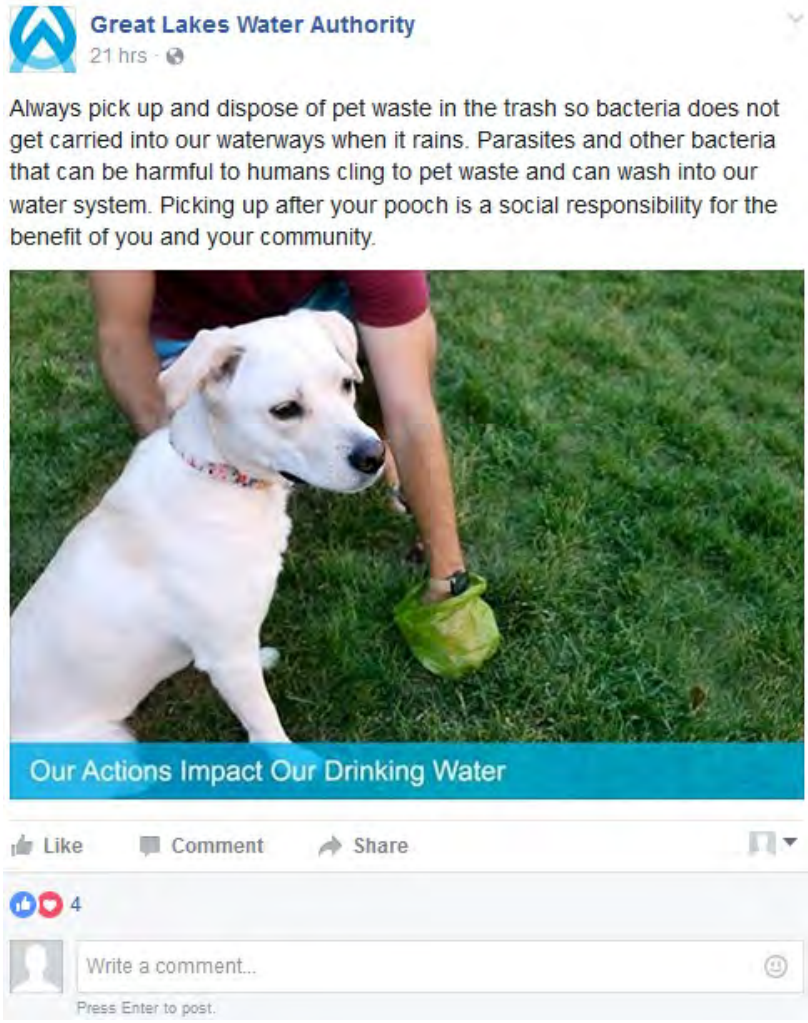


Post/Tweet 4


Great Lakes Water Authority
October 31 at 2:33pm
Dumping hazardous household waste (oil, gasoline, cleaning products, etc.) down storm drains, sinks or on the ground can be scary for our water and the environment Instead, take them to a recycling location. Find one in your community: http://www.michigan.gov /.../0,4561,7-135-70153_69695-115394--...
Our Actions Impact Our Drinking Water
Like
Comment
Share
2
Write a comment...
Press Enter to post.


Great Lakes Water MI @glwatermi · Oct 31
Never dump hazardous waste down storm drains, sinks or on the ground. Instead, take them to a recycling location.
facebook.com/glwater/photos ...
Our Actions Impact Our Drinking Water
2
1

Post/Tweet 5

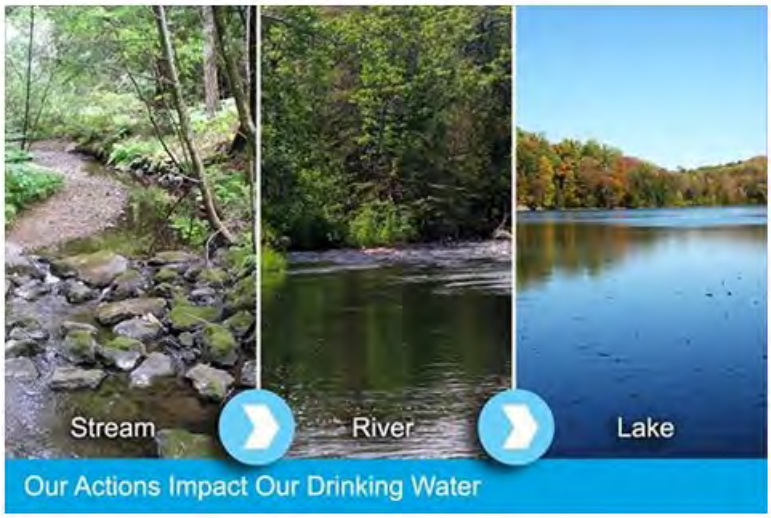

Great Lakes Water Authority
21 hrs
Always pick up and dispose of pet waste in the trash so bacteria does not get carried into our waterways when it rains. Parasites and other bacteria that can be harmful to humans cling to pet waste and can wash into our water system. Picking up after your pooch is a social responsibility for the benefit of you and your community.
Our Actions Impact Our Drinking Water
Like
Comment
Share
4
Write a comment...
Press Enter to post.


Great Lakes Water MI @glwatermi · 21h
Pick up and dispose of pet waste in the trash so bacteria does not get carried into our waterways when it rains. facebook.com/glwater/photos

Post/Tweet 6

Great Lakes Water Authority
November 9 at 4:14pm

Michigan has over 36,000 miles of rivers and streams. These waterways drain into the Great Lakes system. Leaving no trace when near our water sources is an important step in protecting our drinking water.



Like Comment Share

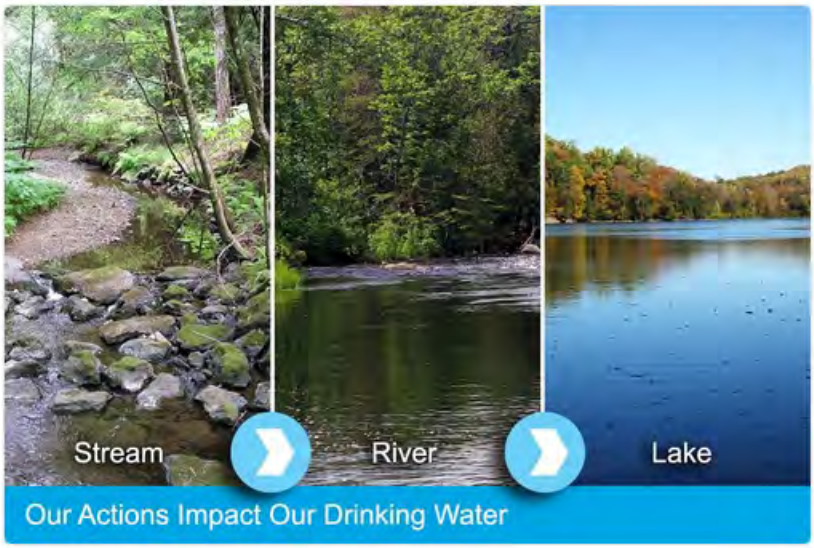
2

Write a comment...

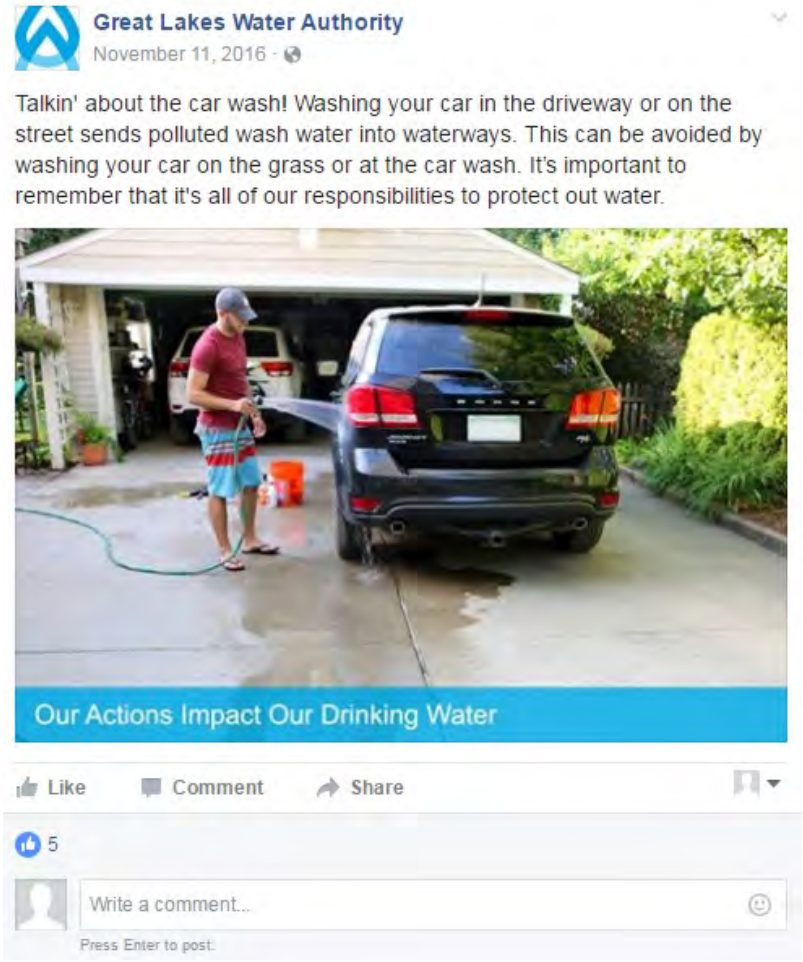
Press Enter to post.

Great Lakes Water MI @glwatermi · Nov 9

Streams and rivers drain to the Great Lakes system. Leave no trace when near our water sources.



Post/Tweet 7


Great Lakes Water Authority
November 11, 2016 ·
Talkin' about the car wash! Washing your car in the driveway or on the street sends polluted wash water into waterways. This can be avoided by washing your car on the grass or at the car wash. It's important to remember that it's all of our responsibilities to protect out water.
Our Actions Impact Our Drinking Water
Like
Comment
Share
5
Write a comment...
Press Enter to post.


Great Lakes Water MI @glwatermi · 11 Nov 2016
Washing your car in the driveway sends polluted water into waterways. This can be avoided by washing your car at the car wash or on the lawn
Our Actions Impact Our Drinking Water
1

SWIPPs Enhance Protection of Drinking Water Post/Tweet

Great Lakes Water Authority
April 25, 2016 ·

The Detroit River and Lake Huron are the source of our quality drinking water. Find out how our Surface Water Intake Protection Program is enhancing protection through emergency preparedness, water monitoring and public education.

OCW_SWIPPs_Enhance_Protection_of_Water_1

OUTREACH.GLWATER.ORG | BY GLWA CUSTOMER OUTREACH PORTAL

Like Comment Share

4

Write a comment...

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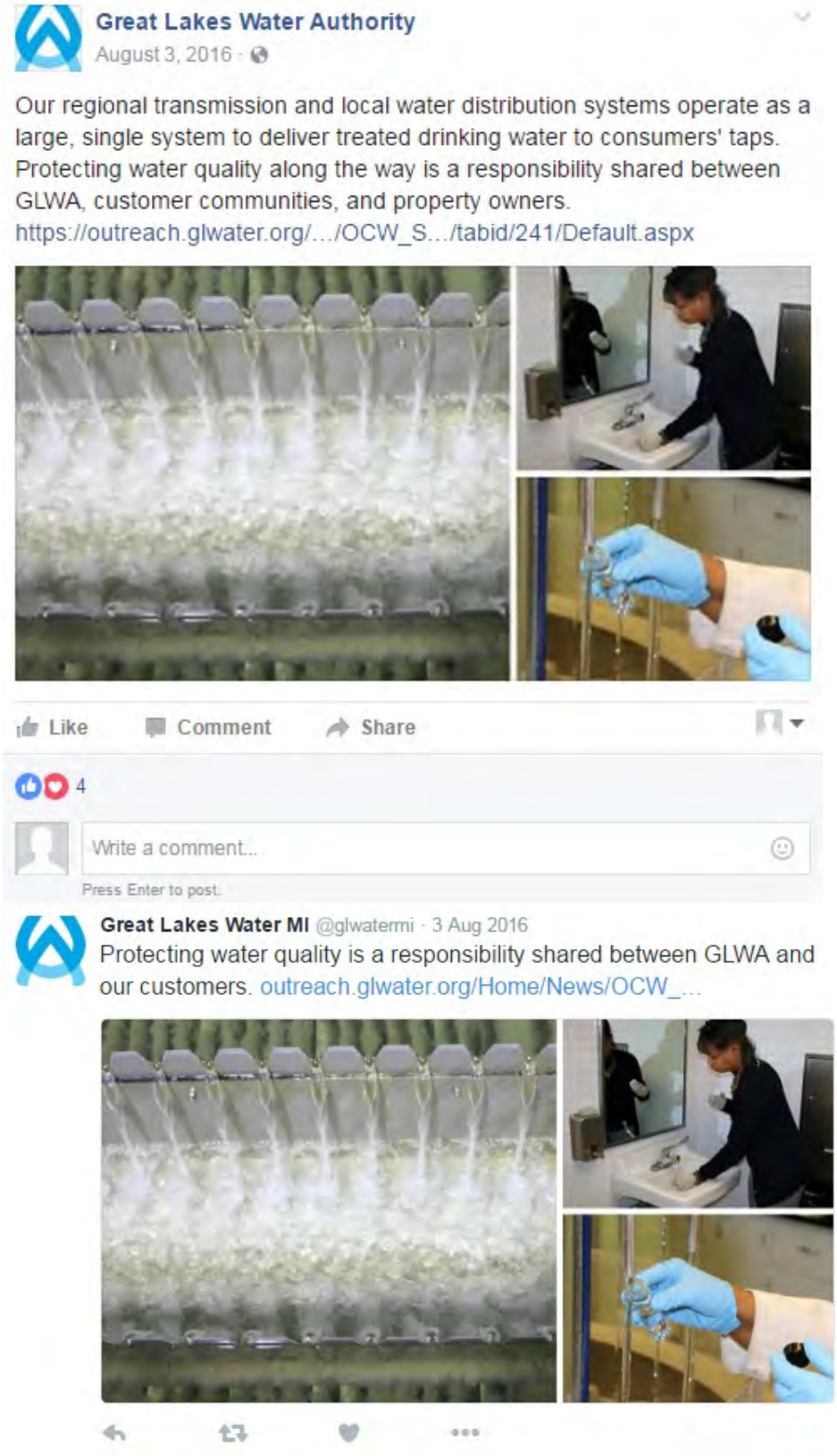
Great Lakes Water MI @glwatermi · 25 Apr 2016

Learn how we're raising the bar when protecting the source of our drinking water: bit.ly/1Sznwvs

1 1

Safeguarding Our Drinking Water Quality Post/Tweet



Changing Personal Care Habits to Protect Our Drinking Water Post/Tweet

Great Lakes Water Authority
November 22, 2016 ·

More than 50 percent of the U.S. population are prescribed two prescription drugs. Trace contaminants from these and other drugs get into our waterways from people excreting them, flushing them down the toilet, or washing them off their bodies. Here are four steps on how to properly dispose of of your prescription drugs.

OCW-Changing-Personal-Care-Habits

Widespread Use of Pharmaceuticals Increases Need for Proper Disposal
According to the Mayo Clinic, nearly 70% of Americans take at least one prescription drug. More than half of the population takes two drugs. Antibiotics,...

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Great Lakes Water MI @glwatermi · 22 Nov 2016

Disposing of your prescription drugs properly can make a major difference in our water ways. Learn more:
outreach.glwater.org/Home/News/OCWC…

Prescription Drugs Take Back Program Post/Tweet

Great Lakes Water Authority
October 22, 2016 ·

Is your medicine cabinet full of expired drugs or medications you no longer use? Do you know how you should dispose of them? Follow any specific disposal instructions on the prescription drug labeling or patient information that accompanies the medicine. Do not flush medication down the sink or toilet unless this information specifically instructs you to do so. The best way to dispose of your medication is to take them to an authorized collector. Find one nearby: https://apps.deadiversion.usdoj.gov/.../NTBI-PUB.pub;jsession...

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Great Lakes Water MI @glwatermi · 22 Oct 2016

Flushing medication down the toilet can be harmful. Here's how to properly dispose of your expired medication.facebook.com/glwater/photos...

GLWA
Great Lakes Water Authority

735 Randolph
Detroit, MI 48226

GREAT LAKES WATER AUTHORITY

SURFACE WATER INTAKE PROTECTION PROGRAMS PUBLIC EDUCATION ACTIVITIES REPORT

2017

PREPARED BY:
GLWA MEMBER OUTREACH
PUBLIC EDUCATION WORK GROUP

GLWA
Great Lakes Water Authority

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Background

The Great Lakes Water Authority's (GLWA) Surface Water Intake Protection Programs (SWIPPs) for the Belle Isle, Lake Huron and Fighting Island intakes were approved by the Michigan Department of Environmental Quality (MDEQ) in early 2016. The SWIPPs build on the past source water assessment programs that have been in effect since 2004 and include additional protection efforts. Public education was identified as a key component of the SWIPPs since individual actions impact surface water quality and ultimately our sources of drinking water. Recognizing the opportunities available within the GLWA's member outreach program to address SWIPP public education topics with member communities, the plans called for semi-annual discussion of SWIPP topics at Public Education Work Group meetings. The Public Education Work Group supported this effort during 2017 by developing SWIPP education messages, writing articles and creating social media posts. This report summarizes the efforts undertaken during 2017.

Activities undertaken and summarized in this report include:

- Discussions at five Public Education Work Group meetings
- Publication of two articles and two brochures on the member outreach portal
- Fifteen social media posts through GLWA Facebook and Twitter

Discussions at Public Education Work Group Meetings

The Public Education Work Group met six times during 2017. SWIPP discussions took place at five of the meetings. Excerpts from the meeting summaries follow showing the development of SWIPP messages and delivery of those messages in articles and social media posts.

January 18, 2017 Meeting Discussion

The SWIPP Public Education Activities Report was distributed for the group's review. The report was created to document SWIPP educational efforts undertaken by the PEWG so there is a record should it be needed for MDEQ reporting in the future. There were no changes required to the report. Michelle Zdrodowski (GLWA) noted that Public Affairs is keeping a copy on file.

The article from C&G Newspapers was discussed and it was noted that the reporter was determined to get a controversial story. Cheryl Porter (GLWA) did an excellent job and did not give her the story. The WSU professor's quotes were concerning but it was noted that academia has different objectives than water professionals. It was concluded that the information the PEWG created on the topic did not present or reinforce some of the messages the reporter was sending. It was agreed that selling the value of tap water is important and that we should try to do this where we can in SWIPP messaging and articles.

While on this topic, Madison Ziems (GLWA) mentioned the Youth Connection project in Detroit regarding PPCPs. The group would like educational materials on the topic to use in their education efforts with youth. It was agreed that the best approach is to send them the PPCP brochure. Madison agreed to handle this. It was also noted that a University of Michigan intern that has been doing research with GLWA is writing a paper on a PPCP-related topic. This might be a source of information to use in the future. Madison agreed to keep the group apprised of these efforts.

March 15, 2017 Meeting Discussion

Wendy Sherrill (Wade Trim) presented the draft social media posts she prepared on SWIPP topics for World Water Day, Earth Day, Pay it Forward Day, National Prescription Drug Take-Back Day and National

Drinking Water Week. It was noted that the theme of this year's World Water Day is wastewater. Wendy will send the posts and photographs to Aftab to incorporate into their social media calendar.

Wendy reviewed the messages for the next Operation Clean Water article, Protecting our Drinking Water – Everyday Actions that Matter!. The top actions to prioritize in the article and brochure were reviewed and updated as follows:

- Proper disposal of household hazardous waste including pharmaceuticals
- Proper lawn care and fertilizer and pesticide use
- Pick up pet waste
- Keep storm drains clear of debris
- Car care
- Maintain your septic system (if you have one)

Once the article is finalized, a brochure will be developed in the same format as the FOG, flushed wipes and PCPP (personal care products and pharmaceuticals) brochures. A plan will then be developed to roll out all of the brochures to members through an iContact email.

May 17, 2017 Meeting Discussion

The best approach to handling SWIPP social media post ideas around celebrated days and holidays was discussed. Since GLWA now has an individual responsible for social media posts, it makes sense to let that individual handle it. Aftab Borka (GLWA) will review the ideas for social media posts and determine the best way to incorporate these ideas into GLWA's overall social media campaign. He will report back at the July 19 meeting on how these ideas could fit into GLWA's social program. Trude will send Aftab the SWIPP Public Education Activities Report to provide him with additional background information on the public education goals.

While on the topic, Mary Lynn Semegen (GLWA) noted that the International Association for Great Lakes Research (IAGLR) was being held at Cobo this week. Carol Miller from Wayne State University and Amy Mangus from SEMCOG are speaking at the conference. It was suggested that a SWIPP-related post be created about this conference. Devan Rostorfer (SEMCOG) also mentioned that Great Lakes Fresh Water Week is coming up June 3-11.

Mary Lynn stated that MDEQ has asked them to monitor microcystins this summer at the river intakes in June and July. Microcystins are found in blue-green algae. New monitoring equipment is also being installed at the Belle Isle intake to monitor chlorophyll A and phycocyanin, indicators of blue-green algae. A short Operation Clean Water article can be developed highlighting this work after testing is completed this summer.

The updated layout and draft of the Everyday Actions to Protect Our Drinking Water brochure were reviewed and the below comments received.

- New design is good. Modify front cover so there is less white space on the bottom.
- Concern about whether the logo should be on the left side of brochures was discussed. Stephanie agreed to follow up and let Trude know if there is a brand standard related to placement of the logo on brochures.
- The text on the front was edited to change "raw water" to "source water" in the first sentence. In the second sentence, "water source" was changed to "resource".

- The first paragraph on the back panel needs additional editing; the second paragraph is fine as is. The first paragraph should integrate the "One water" concept into source water protection. Trude and Mary Lynn will edit the text.
- The picture with the tighter crop of the person drinking water was selected as the cover photo.
- The existing brochures (PPCPs, FOG, flushed wipes) will be redesigned using the new format. The water-related topics will use blue as the primary color and the wastewater topics will use the green color in the GLWA palette. The back of the wastewater related brochures will be modified to use "WRRF" instead of "WWTP".

While on this topic, it was noted that Michele Arquette-Palermo of Cranbrook will be attending our next meeting to share information and receive work group feedback on an effort underway by Cranbrook for a regional public education campaign related to water. Cranbrook is taking the lead on the program and working with the Erb Foundation. The program includes activities to measure the effectiveness of different education initiatives. Michelle is also working with SEMCOG's Partners for Clean Water group. The program grew out of the need for additional support in this area. Within the Partners for Clean Water, only one watershed group has a person that works on social media.

An initial strategy for extending the reach of SWIPP public education into upstream areas was discussed. The strategy includes the steps below.

1. Call Drain Commissioners (DCs) and Public Health Departments (PHDs) to open a dialogue and find out more about local public education efforts on watershed protection
   a. Identify what topics they are covering and where there are gaps.
   b. Identify local newspapers and newsletters that people read.
   c. Determine what their relationship is like with local newspapers.
   d. Tell them about the GLWA's SWIPP, our materials and ask if they would use. Discuss specific uses such as post on website, social media or distribute printed copies.
   e. Discuss where Everyday Actions article could be used in their area.
   f. Follow up after they have reviewed materials and see if they have any suggestions on how to better customize message to upstream area.
2. Review Watershed Groups/Friends Groups and Soil Conservation Districts websites in more detail to better understand their outreach activities and determine if there are opportunities for collaboration on SWIPP messaging.
3. Identify good sources of septic tank materials that could be used if this is a gap area.
4. Reshape Everyday Actions article to include introduction about why their actions matter locally and to GLWA water supply.
5. Contact communities/groups with local newsletter to see if they would publish Everyday Actions article if provided to them.

Trude Noble (Wade Trim) will work on items 1 and 2 and report back at the next work group meeting.

July 19, 2017 Meeting Discussion

Updated text was reviewed and approved for the back panel of the two SWIPP-related brochures: *Everyday Actions to Protect Our Drinking Water* and *Change Personal Care Habits to Protect Our Drinking Water*. Revised layouts for the sewer-related brochures that are consistent with the new GLWA brand were also reviewed. Michelle Zdrodowski (GLWA) confirmed logo placement and the use of green on the sewer brochure were good. It was agreed to post the brochures on the outreach portal and GLWA website, and to encourage GLWA member communities to use them. Four brochures will be mailed to each member's DPW suggesting that they provide copies at the Water/Sewer counters.

GLWA posts three times a week on social media. Aftab Borka has reviewed the SWIPP Social Media Ideas document and is incorporating compatible ideas into the GLWA social media calendar. Aftab agreed to create posts to promote the above referenced brochures. Madison Ziems (GLWA) asked about the suggested idea to reach out to GLWA member communities active on social media and ask them to follow GLWA and share posts. Michelle said that she will reach out to the SEMCOG Communicators Group to see if members will follow GLWA and share posts. The group includes individuals from GLWA member communities focused on communications and social media.

Outreach to upstream Drain Commissioners and Public Health Departments in St. Clair, Huron and Sanilac Counties in support of SWIPP education efforts has not occurred yet. Trude Noble (Wade Trim) will work on this before the next meeting. The idea is to open a dialogue and find out what type of public education efforts are underway locally on watershed protection and SWIPP-related topics.

September 20, 2017 Meeting Discussion

A sample set of the four outreach brochures was sent to all GLWA member communities as discussed at the last meeting. Madison Ziems (GLWA) has received four requests for a starter packet with 20 of each brochure. Starter packets will be taken to the One Water Partnering meeting.

Trude Noble (Wade Trim) and Mary Lynn Semegen (GLWA) spoke to Sheri Faust with the St. Clair County Health Department to learn more about educational activities underway in the thumb area. The MDEQ requested that GLWA conduct public education activities in this geographic area related to the SWIPP to increase awareness that upstream activities can impact the GLWA water supply that serves so many communities. Sheri is the Environmental Health Educator for St. Clair County's Storm Water Program, President of the Friends of the St. Clair River, and a member of the St. Clair River AOC Binational Public Advisory Council (BPAC). She is extremely knowledgeable about what is going on in the area and was the ideal first person to reach out to and learn more about current activities.

This is what was learned from the conversation:

- St. Clair County has to comply with stormwater regulations but Sanilac and Huron Counties do not since they do not have large urbanized areas.
- Non point source runoff in Sanilac County is tied to agricultural runoff and the outreach is geared toward BMPs addressing this. Most outreach had been made possible by grants.
- Conservation Districts don't have a strong online presence. They benefit from brochures and articles they can place in their office for foot traffic. Past surveys on how people get information ranked word of mouth, newspapers and conservation districts as the highest.
- St. Clair County Health Dept. works with the Conservation District on an Earth Day Fair event each year. It is held in conjunction with their spring tree sales on the last weekend (Friday/Saturday) in April. Sheri thinks this is a good outreach event. About 70 vendors buy a booth space. Drinking water is a topic covered at the event.
- The Canadian side of the St. Clair River is highly industrialized. Sheri's outreach activities are tied to the Areas of Concern (AOC). The St. Clair River has a drinking water impairment and fish consumption advisories.
- There are 43 Areas of Concern that were identified by the International Joint Commission. The MDEQ Office of the Great Lakes contact for Areas of Concern would be a good person to talk to learn more about upstream areas of intake that we are looking to reach out to.

- St. Clair River AOC Binational Public Advisory Council (BPAC) meets every other month and switches meeting locations between countries. They have guest speakers at their meetings. PAC supports the same messaging as us. They are working to restore the area and need to talk about protection.
- Sanilac County does beach monitoring in the summer. We might want to reach out to them. Their messaging is about healthy swimming water.
- St. Clair County Health Dept. has a stormwater group for the watershed that meets every other month. It includes 13 municipalities and 7 school districts. These are all shoreline communities. These communities need to publish an article related to stormwater each season for permit compliance. They like tips and places to get more information.
- Sanilac and Huron County Health Depts. handle septic tank education and maintenance.
- Drain Commissioners would be good to reach out to.
- St. Clair County Health Department is the only health department in the State that handles the NPDES storm water permit for a county.
- Newspapers in the area have been very supportive of outreach messaging.
- MSU Extension is a good resource if you want to conduct a workshop.
- #1 thing Sheri gets asked is "What can I do?". Need to be as specific and direct as possible in responses – and in the thumb of Michigan this relates to agriculture fields, clay soils, runoff, open drains and ditches, stream and creeks, and Lake Huron and the St. Clair River. Messaging is different – look at nutrient inputs, medicine and pharma in water.
- Beach monitoring is the most active and visible water quality program in St. Clair County. Can tie in with message here that what you are doing impacts surface water.
- Most of the population lives within 3 miles of the shoreline. These people are on municipal water. The rest of the population are on wells.

It was noted that Areas of Concern Public Advisory Councils will likely be invited to stakeholder meetings for the Wastewater Master Planning effort.

Based on what we learned, next steps in SWIPP outreach to upstream areas beyond the service area should include:

- Talk to Conservation Districts and Drain Commissioners to learn more about what they are doing.
- Talk to MDEQ Office of Great Lakes to learn more about Areas of Concern activities in this upstream area.
- Find out more about Sanilac County beach monitoring.
- Explore idea of participating in St. Clair County Earth Day Fair in April 2018.
- Explore idea of reshaping the everyday actions brochure into a newsletter article relevant to thumb area agriculture emphasis with tie at the end to GLWA water source.
- Determine if it would be beneficial to attend a St. Clair BPAC meeting to share materials and goal of outreach.

Aftab Borka (GLWA) reviewed the SWIPP-related social media posts that were posted since the last work group meeting:

- How can we keep our source water, the Great Lakes, great? Link to podcast with panel of experts including Wayne State University's Donna Kashian (7/21/17)
- Protecting our source water is one of GLWA's top priorities with link to SWIPP article (7/24/17)
- National Dog Day post with link to Everyday Actions brochure (8/25/17)
- Prescription medication can end up in the Great Lakes if they are not disposed of properly with link to Detroit Free Press article (9/15/17)

- Ever wondered why the Detroit River – our source water – is called a river and not a strait with link to WDET article (9/18/17)

It was noted that posts are tying to news items like the Detroit Free Press and WDET stories.

Publication of Articles and Brochures on the Member Outreach Portal

The Public Education Work Group publishes 1- to 4-page articles on topics of interest to member communities about how GLWA and its member communities manage our water and sewer infrastructure to protect public health and the environment. These articles are published under the *Operation Clean Water* masthead, and emailed to member communities, environmental groups and the media. They are also posted on the outreach portal at outreach.glwater.org. Some articles are sent to MWEA and AWWA Michigan for inclusion in their publications.

Two articles related to SWIPP topics were published:

- *Protecting Our Drinking Water – Everyday Actions that Matter!.* Posted to the portal and emailed on April 21, 2017, this 2-page article encourages people to change their everyday actions to reduce pollutants to our waterways and protect our source water. The SWIPPs are referenced.
- *Supporting Research to Learn More About Harmful Algal Blooms.* Posted to the portal and emailed on December 14, 2017, this 2-page article described GLWA's participation in a study to help the MDEQ research why blue-green algal blooms in lakes sometimes contain microcystin toxins that can negatively impact drinking water supplies. The SWIPPs are referenced.

These articles are included in Attachment A. An *Everyday Actions to Protect Our Drinking Water* tri-fold brochure was also developed that can be printed and used within and outside the GLWA service area. In addition, the previously published *Change Personal Care Habits to Protect Our Drinking Water* brochure was updated. These two SWIPP-related brochures, shown in Attachment B, were combined with updated versions of the *Prevent Fats, Oil and Grease from Clogging Our Sewers* and *Sewer System Bears the Cost of Flushed Wipes* brochures and sent as an outreach brochure packet to all GLWA member communities on July 21, 2017. The Public Education Work Group encouraged GLWA member communities and adjacent communities to use these brochures with their customers.

Social Media Posts Through GLWA Facebook and Twitter

The Public Education Work Group collaborated on social media post ideas around celebrated days and holidays. Fifteen posts on SWIPP topics tied to relevant celebrated days and holidays as well as topics featured in the published *Operation Clean Water* articles were created. All posts are shown in Attachment C.

ATTACHMENT A

ARTICLES RELATED TO SWIPP TOPICS

GLWA
Great Lakes Water Authority

PROTECTING OUR DRINKING WATER – EVERYDAY ACTIONS THAT MATTER!

Operation Clean Water

The quality of our drinking water begins at its source. In Southeast Michigan, we are fortunate to have access to one of the nation's best sources of raw water – the Great Lakes waterways. Water drawn from the Detroit River and Lake Huron is treated by the Great Lakes Water Authority (GLWA) to supply drinking water to nearly 4 million people. Protecting this valued resource is a shared responsibility between government, businesses and citizens.

Everyday actions of people can contribute pollutants to our waterways and potentially impact the quality of our source water. Negative impacts can result from activities near the water and in areas further away that drain to the river or lake. Understanding how different actions can impact nearby surface waters is critical for protection.

Pollutants make their way into our surface waters in a variety of ways. The most common route is through stormwater runoff. When it rains, stormwater flows over roadways and parking lots, picking up pollutants like sediment, oil and heavy metals. It also runs off lawns that can contribute pesticides, fertilizer, leaves, and bacteria from animal waste. This polluted water eventually enters a storm drain or ditch that connects directly to our waterways.

"There are many actions people can take in their daily routines to help keep pollutants out of stormwater runoff and protect our drinking water," explains Mary Lynn Semegen, Water Quality Manager for GLWA.

"These pollutants build over time. Small actions can have a big impact when multiplied by the number of people in our watershed."

Easy Ways to Keep Home Pollutants Out of our Waterways

Lawn care practices are a great place to start protecting our drinking water. Fertilizer, pesticides and herbicides should be used sparingly and limited to the lawn only. If any of these materials fall on driveways and sidewalks, sweep them back onto the lawn to keep them from washing into storm drains. Avoid using a hose to clean driveways and sidewalks. Mower decks should be set to at least three inches high to limit cutting to one-third of grass length and encourage root growth. Consider having your soil tested to determine your lawn's actual nutrient needs and adjust your lawn care practices accordingly.

"The key to a great lawn is density," says Kevin Frank, Michigan State University Associate Professor and Extension Turf Specialist. "A thick turf will have fewer weeds and be more resistant to pests and diseases. Build density by mowing high on a weekly basis and recycling clippings back onto the lawn as free food. Fertilizer should never be used before a heavy rain storm when nutrients will likely wash off."

Animal and human waste can contribute disease-carrying bacteria into our drinking water sources. Pick up pet waste promptly from your yard or during

Everyday actions taken outside and inside your home can help keep pollutants out of our drinking water sources – the Detroit River and Lake Huron. Even small actions can have a big impact when multiplied by the millions of people that live in our watershed.

a walk and dispose of it in the trash. Homes within GLWA's service area that use septic systems should focus on proper operation and maintenance to avoid failure and costly repairs. Failing septic systems release bacteria, viruses and toxic chemicals into the ground that eventually reach our waterways.

Pollutants are also generated when we wash and service our cars. Wash your car at a commercial car wash or on the lawn to keep oils, grease, phosphates from soap, and heavy metals from washing into the storm drain. Car leaks and drips should be fixed and used fluids, such as oil and antifreeze, should be properly disposed of at household hazardous waste collection events or businesses that accept them. Never dump any of these products down the storm drain – rain is the only thing meant to go down the drain.

Many indoor household products are also hazardous to our waterways. Cleaning, home improvement, automotive, and personal care products, as well as over the counter and prescription medications, should be properly disposed of and never put down a sink, toilet or storm drain. Many products can be properly disposed of at household hazardous waste collection events. Consider using non-toxic products in place of traditional products. Personal care products that contain microbeads and anti-bacterial agents have been proven harmful to the environment and should be avoided.

GLWA Strengthens Source Water Safeguards

GLWA is committed to protecting against pollutants that make their way to our source water. Surface Water Intake Protection Programs (SWIPPs) were developed for each of the three intakes in the Detroit River and Lake Huron that supply GLWA's water treatment plants. Each SWIPP enhances intake protection through water quality monitoring, emergency preparedness and public education.

"GLWA belongs to the Huron to Erie water quality monitoring network," continues Semegen. "We are constantly monitoring our source water at the Detroit River and Lake Huron intakes. We also monitor water throughout the treatment and distribution process to make sure it is safe from our water treatment plants to our customers' taps."

GLWA is focusing on public education to increase public awareness and understanding of the need to safeguard our surface water. Materials are being developed for customers to use in their communities along with social media posts. Efforts are also being undertaken to promote use of these materials in upstream areas, beyond the GLWA service area, that are also potential sources of pollutants.

"It's a lot easier to keep contaminants out of our water supply than to wait until a contaminant is found and have to find the technology to remove it," cautions Semegen. "We all play a part in protecting our watershed and being stewards of the environment to ensure that future generations have high quality drinking water."

Everyday actions matter. Consumers can do their part to protect our source water by choosing routine activities that limit pollutants in stormwater runoff and staying informed about water quality issues. Acting in environmentally-conscious ways will benefit public health and help keep our drinking water safe.

Home Actions to Protect Our Drinking Water

- ✓ Use fertilizers, pesticides and herbicides sparingly
- ✓ Mow high and recycle clippings back onto your lawn to encourage dense growth
- ✓ Clean up pet waste and throw it in the trash
- ✓ Wash your car at a commercial car wash and fix leaks and drips
- ✓ Properly dispose of household hazardous waste including products and medications
- ✓ Use non-toxic household and personal care products
- ✓ Properly operate and maintain your septic system
- ✓ Keep storm drains clear of debris and never dump anything into them

Operation Clean Water features articles on how GLWA and its suburban customers manage our water and sewer infrastructure to protect public health and the environment. It was created by the GLWA Customer Outreach Public Education Work Group that includes individuals from wholesale customers (Macomb, Oakland and Wayne Counties and DWSD), GLWA, MDEQ, SEMCOG and consultants. Operation Clean Water is published on the GLWA Customer Outreach Portal at outreach.glwater.org.

SUPPORTING RESEARCH TO LEARN MORE ABOUT HARMFUL ALGAL BLOOMS

Operation Clean Water

Blue-green algal blooms in lakes have gained a lot of media attention and cause for concern. If microcystin toxins are present in the blooms, they can negatively impact nearby drinking water supplies. However, not all blooms become toxic. Research is being undertaken to understand where and why these toxins are forming in certain areas and creating harmful algal blooms (HABs). The Great Lakes Water Authority (GLWA) recently participated in a special study, conducted by the Michigan Department of Environmental Quality (MDEQ), to determine the occurrence and levels of microcystins in the Great Lakes.

"The 10-week study was undertaken from July to September when the blooms occur," explains Mary Lynn Semegen, GLWA's Water Quality Manager. "We did not expect to find microcystins in our raw water but felt it was important to volunteer and be part of the research. We served as one of the non-targeted water utilities in the control group."

Ten targeted and six non-targeted water utilities monitored their source water for microcystins as part of the MDEQ study on source water at water treatment plants. Another study was conducted on HABs in Michigan's inland lakes. Both studies are helping MDEQ to improve our understanding of HABs and to compare microcystin results using different analytical methods.

Microcystins were not present in any of the raw water samples GLWA tested from Water Works Park or the Southwest Water Treatment Plant during the study. If any of the samples had tested positive, MDEQ would have been notified and additional samples taken.

Importance of Understanding and Monitoring for HABs

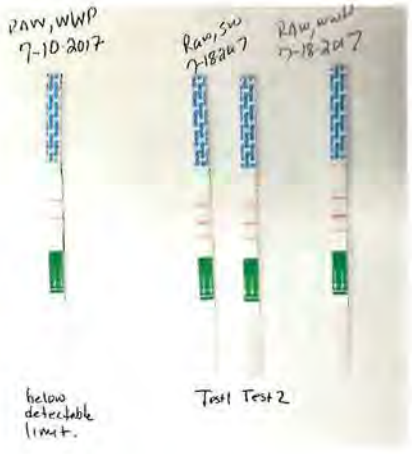
HABs contain blue-green algae, also known as cyanobacteria, that produce microcystins and other cyanotoxins. These cyanotoxins create problems for both drinking water supplies and recreational body-contact waters.

Specific environmental conditions must occur before certain cyanobacteria produce a bloom and form microcystins. Scientists are currently working on determining the mechanism that triggers these organisms to die and produce microcystins. Some factors influencing the production of HABs include nitrogen and phosphorus concentrations, elevated water temperature and low-flow, stagnant conditions.

The algal bloom in Lake Erie in 2014 that caused a "do not drink advisory" for Toledo triggered regulatory action by the US Environmental Protection Agency (EPA). In June of 2015, the EPA issued 10-Day Drinking Water Health Advisories (HAs) for microcystins and cylindrospermopsin, two cyanobacterial toxins.

HAs are issued to provide informal technical guidance for contaminants that are not subject to primary drinking water regulation to states and utilities to

GLWA chemists used an enzyme-based analyti¬cal method developed by Abraxis to test raw water samples during the study. A test strip is dipped into a vial containing the sample water and special reagents. The result ap¬pears on the bottom pink line of the test strip, and is compared to the top pink control line. If the result is equal to or greater in color than the control line, it is negative for microcystin.



protect public health. The HAs are based on the age of the individual, microcystin level and duration of exposure.

"The cyanobacteria that can frequently produce microcystins are Microcystis, Anabaena, Oscillatoria and Planktothrix," explains Semegen. "GLWA monitors these and other organisms during our twice weekly plankton counts. Elevated levels of these organisms will trigger additional monitoring and treatment by GLWA."

There are several conventional and advanced water treatment options for removal of microcystins during water treatment. Treatment plants utilizing ozone, like GLWA's Water Works Park, are capable of reducing the level of microcystin toxins.

Supporting GLWA's Surface Water Intake Protection Program

Participating in the MDEQ study and routinely monitoring for microcystins support GLWA's Surface Water Intake Protection Program or SWIPP. The SWIPP is focused on protection of surface waters that feed the three raw water intakes.

"GLWA remains focused on protecting drinking water," continues Semegen. "This is one way of using monitoring to protect the safety of drinking water. More thorough testing is coming up for other cyanotoxins during the next cycle of the unregulated contaminant monitoring rule (UCMR)."

The UCMR is a rule under the Safe Drinking Water Act that requires testing for contaminants that may be regulated in the future. The testing is conducted every five years and includes up to 30 unregulated contaminants identified by EPA. The next UCMR monitoring will occur between 2018 and 2020 and includes 10 cyanotoxins including seven types of microcystins.

"Limiting nutrients in lakes is key to controlling microcystins. While agricultural runoff is felt to be the primary culprit, we are all responsible for doing our part," concludes Semegen. "Lawn fertilizers can contain high amounts of nitrogen and phosphorus. Every day actions like using lawn fertilizer sparingly and setting the mower high to encourage dense growth make a difference."

Blue-Green Algae Blooms and Microcystins

- Blue-green algae is another name for cyanobacteria that contains blue pigment in its cells.
- Certain species of blue-green algae release microcystin toxins when they die.
- Harmful algal blooms (HABs) contain cyanobacteria that produce toxic microcystins and can threaten sources of drinking water.
- HABs are more likely to occur in shallow, fresh water with warm temperatures, plenty of sunlight and excessive amounts of nutrients (phosphorus and nitrogen).
- There are 3,000 known species of blue-green algae and 80 known chemical forms of microcystin.
- Scientists are working on determining the mechanism that triggers cyanobacteria to produce microcystins.
- Zebra mussels like to eat beneficial green algae but not blue-green algae. As a result, zebra-mussel infested lakes can have a disproportionate amount of blue-green algae.

Operation Clean Water features articles on how GLWA and its member communities manage our water and sewer infrastructure to protect public health and the environment. It was created by the GLWA Member Outreach Public Education Work Group. Operation Clean Water is published on the GLWA Member Outreach Portal at outreach.glwater.org.

ATTACHMENT B

BROCHURES RELATED TO SWIPP TOPICS

GLWA
Great Lakes Water Authority

should be fixed and used fluids, such as oil and antifreeze, should be properly disposed of at household hazardous waste collection events or businesses that accept them.

Household Hazardous Waste

Many indoor household products are hazardous to our waterways. Cleaning, home improvement, and personal care products, as well as over the counter and prescription medications, should be properly disposed of and never put down a sink, toilet or storm drain. Many products can be disposed of at household hazardous waste collection events. Consider using non-toxic products in place of traditional products. Personal care products that contain microbeads and anti-bacterial agents have been proven harmful to the environment and should be avoided.

GLWA Safeguards

The Great Lakes Water Authority (GLWA) is committed to protecting against pollutants that make their way to our source water through:

- Surface Water Intake Protection Programs (SWIPPs) that protect each water intake through water quality monitoring, emergency preparedness and public education
- Active participation in the Huron to Erie water quality monitoring network

Water moves through the environment into our waterways, and is treated by our water treatment plants. Protecting the quality of this source water protects our future drinking water.

Take your responsibility seriously. Choose routine activities that limit pollutants in stormwater runoff and stay informed about water quality issues.

GLWA
Great Lakes Water Authority

Customer Outreach

GLWATER.ORG
PUBLICATION DATE: JULY 21, 2017

EVERYDAY ACTIONS TO PROTECT OUR DRINKING WATER

The Detroit River and Lake Huron provide the source water that is treated to produce drinking water for more than 4 million people. Protecting this valued resource from pollutants generated by household activities is important to the region. Learn how to take proactive steps around the house to prevent contaminants from reaching our water source.

GLWA
Great Lakes Water Authority

Customer Outreach

Pollutants make their way into our rivers and lakes in a variety of ways. The most common route is through stormwater runoff. When it rains, stormwater flows over roadways and parking lots, picking up pollutants like sediment, oil and heavy metals. It also runs off lawns that can contribute pesticides, fertilizer, leaves, and bacteria from animal waste. This polluted water eventually enters a storm drain or ditch that connects directly to our waterways.

Waterways can be negatively impacted by activities nearby and in areas further away that drain to the river or lake. No matter where you live, actions can be taken to help keep pollutants out of stormwater runoff and protect our sources of drinking water.

Lawn Care

Lawn care practices are a great place to start. Fertilizer, pesticides and herbicides should be used sparingly and limited to the lawn only. If any of these materials fall on driveways and sidewalks, sweep them back onto the lawn to keep them from washing into storm drains. Avoid using a hose to clean driveways and sidewalks. Mower decks should be set to at least three inches high to limit cutting to one-third of grass length and encourage root growth. Consider having your soil tested to determine your lawn's actual nutrient needs and adjust your lawn care practices accordingly.

Pet Care and Septic System Maintenance

Animal and human waste can contribute disease-carrying bacteria into our drinking water sources. Pick up pet waste promptly from your yard or during a walk and dispose of it in the trash. Homes that use septic systems should focus on proper operation and maintenance to avoid failure and costly repairs. Failing septic systems release bacteria, viruses and toxic chemicals into the ground that eventually reach our waterways.

Car Care

Pollutants are also generated when we wash and service our cars. Wash your car at a commercial car wash or on the lawn to keep oils, grease, phosphates from soap, and heavy metals from washing into the storm drain. Car leaks and drips

Routine actions taken outside and inside your home can help keep pollutants out of our drinking water sources. Even small actions can have a big impact when multiplied by the millions of people that live in our watershed.

Everyday Actions Matter

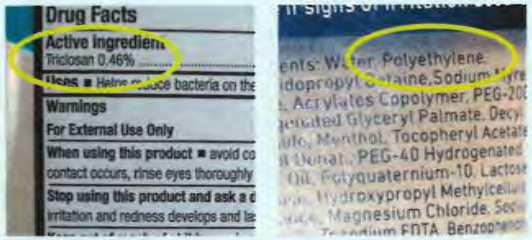
- Use fertilizers, pesticides and herbicides sparingly
- Keep grass at least 3 inches high when mowing and recycle clippings back onto your lawn
- Clean up pet waste in your yard or on walks and throw it in the trash
- Wash your car at a commercial car wash and fix leaks and drips
- Properly dispose of household hazardous waste
- Use non-toxic household and personal care products
- Avoid personal care products that contain microbeads and anti-bacterial agents
- Properly operate and maintain your septic system to prevent failure
- Keep storm drains clear of debris and never dump anything into them

Personal Care Products

Personal care products include soap, shampoo, toothpaste, deodorant, lotion, make-up and other products. While products are safe for personal use, some ingredients have proved harmful to the environment. Microbeads and 19 antibacterial chemicals were recently banned and are being phased out of products. Consumers can get a head start on water protection by reading labels and purchasing products without these ingredients.

Avoid Harmful Products

- Do not purchase products that contain polyethylene or polypropylene, the chemical ingredients of microbeads. These plastic beads are too small to remove during the wastewater or water treatment processes.
- Do not purchase soaps that contain triclosan or triclocarban, the two most common antibacterial ingredients. There is no evidence to support that these ingredients are better than regular soap.
- Use alcohol-based hand sanitizers if soap is not available.



Water moves through the environment into our waterways, and is treated by our water treatment plants. Protecting the quality of this source water protects our future drinking water.

Take your responsibility seriously. Don't flush drugs or use personal care products that are harmful to the environment.

GLWA
Great Lakes Water Authority

Customer Outreach

CHANGE PERSONAL CARE HABITS TO PROTECT OUR DRINKING WATER

As personal care products evolve and we take more medications, the waste from our society has changed to include ingredients from soap, like microbeads and anti-bacterial agents, and trace amounts of prescription drugs. While public health has not been impacted, we need to look at how we use and dispose of these products to protect our drinking water supplies.

GLWA
Great Lakes Water Authority

Customer Outreach

GLWATER.ORG
PUBLICATION DATE: JULY 21, 2017

Pharmaceuticals and personal care products, known as PPCPs, provide a daily source of contaminants to our waste stream that wastewater treatment plants and septic tanks were not designed to fully remove. These waste byproducts are showing up in our nation's rivers and lakes in extremely low levels.

Medical Drugs

According to the Mayo Clinic, nearly 70% of Americans take at least one prescription drug. More than half of the population takes two drugs. Antibiotics, anti-depressants, painkilling opioids and drugs to lower lipids are the most commonly prescribed medications. Trace contaminants from these and other drugs get into our waterways from people excreting them, flushing them down the toilet, or washing them off their bodies.

Some pharmaceuticals contain endocrine disrupting chemicals (EDCs) that mimic or block the function of natural hormones in the body. So far, scientific evidence has not determined that trace amounts of pharmaceuticals and EDCs in drinking water have an impact on human health. Further research is needed. However, scientific studies have concluded EDCs can affect the growth and development of fish and wildlife.

Proper use and disposal of prescription and over-the-counter (OTC) drugs is crucial. The old guideline of flushing expired or unneeded drugs down the toilet is no longer valid. Dispose of drugs in the trash to reduce their ecological footprint.

Medicine cabinets should be cleaned twice a year to prevent unwanted medications from piling up. Limiting bulk purchases of medications can reduce the number of unused pills that can accumulate and require disposal. Steps to properly dispose of medications are highlighted in the adjacent box.

Proper Medication Disposal

Drug Take-Back Events

- Dispose of unused prescription drugs through a National Prescription Drug Take-Back Day held at local police stations and operated through the Drug Enforcement Agency. These occur annually in the Spring and Fall. In addition, some local government agencies and pharmacies host drug take-back programs for prescription and OTC medications.

- Never flush drugs down the toilet unless the label specifically tells you to do so and you can't wait until the next Take Back Day. (Some narcotic pain relievers and other controlled substances include instructions for flushing to reduce risk of illegal abuse.)

Home Disposal

- Take your prescription or OTC drugs out of their original containers.

- Mix drugs with an undesirable substance, such as cat litter or coffee grounds.

- Put the mixture into a disposable container with a lid or a sealable bag and place in the trash.

- Use a permanent marker to cover personal information before discarding prescription drug bottles.

ATTACHMENT C

SOCIAL MEDIA POSTS

GLWA
Great Lakes Water Authority

Drinkable Water on Earth Post/Tweet

Great Lakes Water Authority
Apr 19

Only a small percentage of Earth's water is drinkable. Make sure you're doing your part to use it wisely.

Great Lakes Water MI @glwatermi · Apr 19

Did you know only a fraction of a percent of Earth's water is drinkable?

1 1

Earth Day Post/Tweet

Great Lakes Water Authority
April 22 at 10:52am

This Earth Day is a great opportunity for all of us to take these 8 simple steps and protect our drinking water. Take a look and see how you can do your part! https://outreach.glwater.org/LinkClick.aspx...

Like Comment Share

Great Lakes Water MI @glwatermi · Apr 22

On this #EarthDay, here are 8 easy steps you can take to protect our drinking water. Learn more: outreach.glwater.org/LinkClick.aspx...

1

National Prescription Drug Take Back Day Post/Tweet

Great Lakes Water Authority
April 28 at 11:05am

This Saturday is National Prescription Drug Take Back Day. Help us spread the word about safely disposing your drugs and protecting our water source. Learn more and find your nearest collection site here: https://apps.deadiversion.usdoj.gov/NTBI/ntbi-pub.pub...

Great Lakes Water MI @glwatermi · Apr 28

On this #DrugTakeBackDay, spread the word to safely dispose prescription drugs and protect our water source. More: apps.deadiversion.usdoj.gov/NTBI/ntbi-pub.

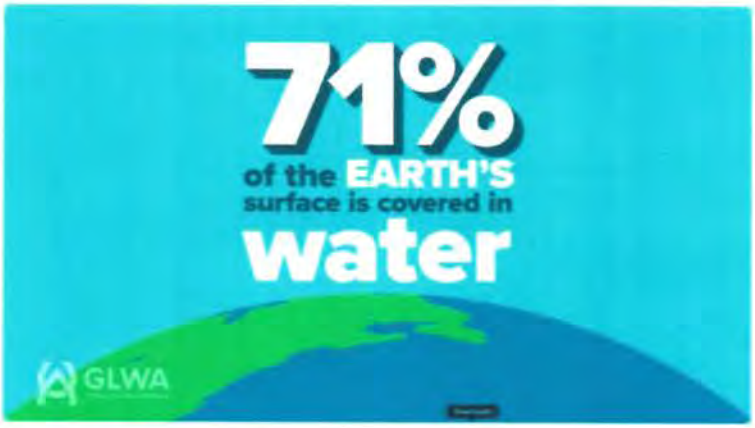
National Drinking Water Week Post/Tweet

Great Lakes Water Authority
May 9

We only use a small percentage of Earth's water. Let's do our parts to protect and preserve our source water during this National Drinking Water Week.

Great Lakes Water MI @glwatermi · May 9

Only a fraction of Earth's water is drinkable. Help us at #GLWA protect it and celebrate #NationalDrinkingWaterWeek. facebook.com/glwater/videos...



1 1

Great Lakes and Fresh Water Week Post/Tweet

Great Lakes Water Authority
June 5 ·

In honor of Great Lakes and Fresh Water Week, we're wondering if you know just how big the Great Lakes are?

Great Lakes Water MI @glwatermi · Jun 5

Have you ever wondered just how large the Great Lakes are? Well, it's Great Lakes and Fresh Water Week so what better time to know than now!

3 6

Drinking Water Source Post/Tweet

Great Lakes Water Authority

Do you know what the source of your drinking water is? Find out the answer to that and some interesting information on your water on our website: http://bit.ly/2topNZH

Great Lakes Water MI @glwatermi · Jul 7

Do you know what the source of your drinking water is? Here's the answer: bit.ly/2topNZH

1 1

Keeping Great Lakes Great – Wayne State University Post/Tweet

Great Lakes Water Authority
Jul 21

How can we keep our source water, the Great Lakes, great? This was a topic of discussion among a panel of experts including Wayne State University's Donna Kashian for a Science Friday podcast and listen in here: http://bit.ly/2sU06wt.

Can The Great Lakes Stay Great?

The North American Great Lakes are changing under the influence of pollution, invasive species, and climate change. How well will they weather this stress?

SOUNDCLOUD.COM

Great Lakes Water MI @glwatermi · Jul 21

Keep our Great Lakes in great shape. This podcast highlights challenges the lakes have faced & its sustainability. bit.ly/2sU06wt

SWIPPs Enhance Protection of Drinking Water Post/Tweet

Great Lakes Water Authority
July 24 ·

Protecting our source water is one of GLWA's top priorities. Learn more about how our Surface Water Intake Protection Programs are developed to do just that through emergency preparedness, water quality monitoring and public education.

OCW_SWIPPs_Enhance_Protection_of_Water_1

Great Lakes Water MI @glwatermi · Jul 24

#GLWA's Surface Water Intake Protection Programs are developed to protect our source water through various steps. bit.ly/2tmEkdl.

National Water Quality Month Post/Tweet

Great Lakes Water Authority
August 11

Did you know that August is National Water Quality Month? We want to personally thank all of our member communities for their commitment to regional collaboration! GLWA is proud to provide water of unquestionable quality to nearly four million Michigan residents. Learn more about our water quality here: http://bit.ly/2ffu3VB.

Great Lakes Water MI @glwatermi · Aug 11

Here's how regional collaboration makes it possible for #GLWA to deliver water of unquestionable quality. bit.ly/2ffu3VB

National Dog Day Post/Tweet

Great Lakes Water Authority
August 25

Tomorrow is National Dog Day, and it's important to know that the way you treat pet waste can have an impact on our drinking water. Here's how: http://bit.ly/2w8c8EN.

Great Lakes Water MI @glwatermi · Aug 25

On #NationalDogDay we'd like to tell you that the way you dispose your pet waste can impact our drinking water. bit.ly/2w8c8EN.

Antidepressants Building up in Fish Brains in Great Lakes – Michigan Radio Post/Tweet

Great Lakes Water Authority
September 15

Prescription medication can end up in the Great Lakes if they are not disposed of properly. Please make sure unused medications safely go to the trash and NOT down the toilet.

Antidepressants are building up in fish brains in the Great Lakes region

Antidepressants that people take are building up in the brains of fish like walleye, bass, and perch. Researchers studied fish from the Niagara River.

MICHIGANRADIO.ORG

Great Lakes Water MI @glwatermi · Sep 15

If not disposed of properly, unused prescription medication can have a negative impact on fish in the Great Lakes: bit.ly/2vU359u

1 2

Detroit River Source Water Post/Tweet

Great Lakes Water Authority
September 18

Ever wondered why the Detroit River – our source water – is called a river and not a strait? It's a fascinating 300-year-long story: http://bit.ly/2gOyAPF

Great Lakes Water MI @glwatermi · Sep 18

Is the Detroit River, our source water, a strait, a river or both? A fascinating 300-year-long story has the answer: bit.ly/2gOyAPF

3

Safe Medication Disposal Video Post/Tweet

Great Lakes Water Authority
October 9

It takes only 60 seconds to learn how to safely dispose of extra medications in your home. Share this video with your friends and help protect our source water: http://bit.ly/2fRQU7s

Great Lakes Water MI @glwatermi · Oct 9
Take 60 seconds and learn how to better protect our source water by safely disposing of medications. bit.ly/2fRQU7s

1 1

National Prescription Drug Take Back Day Post/Tweet

Great Lakes Water Authority
October 28

REMINDER: Today is the National Prescription Drug Take Back day. Please drop off unwanted household medications to a local collection site for safe disposal. It's very important and helps our water quality. Here's why: http://bit.ly/2gSXP0G

Great Lakes Water MI @glwatermi · Oct 28

Don't forget to drop off unwanted household medications today at a local #DrugTakeBackDay location. Learn more: bit.ly/2gSXP0G

GLWA

Great Lakes Water Authority

2018

SURFACE WATER INTAKE PROTECTION PROGRAMS

Public Education Activities Report

Table of Contents

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Attachments

Attachment A – Article Related to SWIPP Topics

Attachment B – Brochures Related to SWIPP Topics

Attachment C – Opportunities for Expanding SWIPP Outreach Upstream of the Lake Huron Intake

Attachment D – Social Media Posts

Attachment E – Educational Resource Package for K-12 Students

Background

The Great Lakes Water Authority's (GLWA) Surface Water Intake Protection Programs (SWIPPs) for the Belle Isle, Lake Huron and Fighting Island intakes were approved by the Michigan Department of Environmental Quality (MDEQ) in early 2016. The SWIPPs build on the past source water assessment programs that have been in effect since 2004 and include additional protection efforts. Public education was identified as a key component of the SWIPPs because individual actions impact surface water quality and ultimately our sources of drinking water.

Recognizing the opportunities available within the GLWA's member outreach program to address SWIPP public education topics with member communities, the plans called for semi-annual discussion of SWIPP topics at Public Education Work Group meetings. The Public Education Work Group, together with GLWA's Public Affairs group supported this effort during 2018 by developing SWIPP education messages, writing article and brochures, attending community events and sharing social media posts. This report summarizes the efforts undertaken during 2018.

Activities undertaken and summarized in this report include:

- Discussions at five Public Education Work Group meetings
- Publication of one article and three brochures/fliers on the member outreach portal
- Fifteen social media posts through GLWA Facebook and Twitter

Discussions at Public Education Work Group Meetings

The Public Education Work Group met six times during 2018. SWIPP discussions took place at five of the meetings. Excerpts from the meeting summaries follow showing the development of outreach and education of the importance of protecting our source water via messaging in activities, articles, brochures, events and social media posts.

February 1, 2018 Meeting Discussion

1. Regional Public Education Campaign Update

Michele Arquette-Palermo (Head of the Freshwater Forum at Cranbrook) gave the group an update on the regional water campaign that was recommended as part of the Water Resources Plan for Southeast Michigan. SEMCOG is the designated Water Quality Management Agency for the area and responsible for updating the plan. A cohesive and comprehensive regional campaign needs to be managed by a single entity. Cranbrook Institute of Science offered to do it since they work throughout the Great Lakes Basin. Many non-profit agencies working on water education will use the regional campaign materials.

The goal is to present the campaign plan to the Southeast Michigan Partners for Clean Water group at their meeting in late March and recruit an advisory committee. (This group is led by SEMCOG and facilitates information sharing to facilitate public education on storm water management and related topics.) The advisory committee will help guide campaign messages and how they are delivered. The campaign launch is planned for early 2019.

2. Virtual Tour of Water Works Park, GLWA's Water Treatment Plant

GLWA frequently gets requests from elementary and middle schools to tour the water treatment plant. GLWA requires students to be 12 years or older so this prevents younger students from going on a tour. To address this, GLWA is developing a video tour, so the audience can learn about the water treatment process.

3. SWIPP Outreach

Research on opportunities to reach out to upstream areas resumed. The Michigan Department of Environmental Quality (MDEQ) asked GLWA to conduct public education in upstream areas as feedback to the SWIPPs. An initial interview was held with Sheri Faust with the St. Clair County Health Department. She had suggested reaching out to drain commissioners and soil conservation districts in the area to learn about educational efforts they have underway. She also mentioned that communities and other groups are required to publish newsletter articles as part of their storm water permits and appreciate receiving articles to use.

Trude has emailed drain commissioners and soil conservation districts and will conduct telephone interviews to learn more about their education efforts and the types of requests they receive from the public. It was also noted that the MDEQ Office of Great Lakes will be contacted to learn more about Areas of Concern activities in the upstream area. Trude will wrap up this research by the end of May before she fully transitions off the outreach contract.

Madison Ziems (GLWA) said that she would reach out to MDEQ again about having someone join the Public Education Work Group since the SWIPP is a topic where their expertise would be helpful. Devan mentioned that Melanie Foose at MDEQ and Michelle Selzer, the Lake Coordinator for the Office of Great Lakes might be good to people to reach out to during research.

Potential SWIPP topics for Operation Clean Water articles were discussed. It was noted that SEMCOG is managing the $375,000 grant to fund updating equipment at 14 water treatment plants along the Huron-to-Erie Corridor. Rachael Barlock and Kelly Karll are managing this effort which is just starting up. Timing for an article would be late 2018 or early 2019. An article on GLWA's project to upgrade monitoring equipment at the Belle Isle intake that complements this work can also be published.

It was noted that Michigan Technological University is conducting spill scenario modeling for the Detroit River and work is being done by the National Oceanic and Atmospheric Administration (NOAA) under the Great Lakes Observing System (GLOS). The existing model is being extended into the Detroit River. The model will predict how long it takes for a spill to get to a specific intake when the exact point of the spill is known. It takes the type of chemical into consideration. It was noted that an article probably is not appropriate on this topic due to the sensitive nature of the information.

It was also noted that Carol Miller, Director of Healthy Urban Waters at Wayne State University, is working on the computer server to share data collected along the corridor. Judy Westrick from Wayne State is also supporting the effort with volatile organic compounds (VOC) analysis along the corridor if a spill occurs.

April 5, 2018 Meeting Discussion

1. Retention Treatment Basin (RTB) Report Update

The 8th report RTB was published. Trude Noble (Wade Trim) worked with the Wastewater Best Practices Group to create the report.

The Protecting Our Waterways flyer was also updated to include 2017 discharge data. The Wastewater Best Practices Work Group feels it is important to add onto the data each year rather than limit it to a specific time period such as five years.

2. Green infrastructure in the Home Brochure

A brochure outlining actions residents can take to protect and improve water quality on their properties is in process with a June completion date targeted. The group offered Ideas for the brochure's call to action, noting that rain barrels are a good entry point for residents to gain interest in stormwater. The Erb Family Foundation supports a group, Rain Gardens to the Rescue, which provides classes. Southeastern Oakland County Water (SOCWA) may also have workshops for rain gardens.

3. Water Educational Goal

GLWA and its member partners wish to compile educational resources on water and wastewater topics, to be shared with educators who request them. Doing so supports GLWA's efforts to provide educational information about water and the importance of protecting it. The target age range is K-12 and post-secondary.

Step 1 – Review available resources to determine those that have already been vetted.
Step 2 – Develop a list of online resources and projects. (WEF and AWWA)

Lori Byron (Bridgeport) will contact Michele Arquette-Palermo of Cranbook Science Center to learn what the Center offers.

Additional ideas/suggestions:

- Exhibit at water festivals to promote awareness of water/wastewater issues
- Partner with Watershed Councils
- Develop a Calendar of all the different water and wastewater observances (Drinking Water Week; World Water Week.) Create a plan to push public outreach for young people in conjunction with those events.

4. SWIPP Activities Update – Trude Noble and Mary Lynn Semegen

The Water Quality group at GLWA prepares Surface Water Intake Protection Programs (SWIPPs) for GLWA's 3 surface intakes. Last year, the MDEQ asked GLWA to perform more outreach in the rural area, outside the GLWA's service area, near the Lake Huron intake.

GLWA, SEMCOG and Cranbrook will collaboratively participate in a Regional Water Campaign. When developing material for the campaign, consider collateral and messaging that can be used for non-urban areas, as well as urban.

Another suggestion: provide information for social media for rural areas, interact with those communities on social media. Opportunities for expanding SWIPP outreach upstream of the Lake Huron Intake were highlighted based on interviews conducted with Health Departments, Drain Commissioners and Conservation Districts in the area.

The SWIPP must be approved every six years, currently in year 2.

The full report of outreach effort benchmarking, performed by Trude Noble, is included as an attachment.

June 7, 2018 Meeting Discussion

1. Regional Campaign Update

The Regional Campaign concept began when SEMCOG put together a task force to create a water resource policy. The task force saw the need for a coordinated public education effort, which led to Cranbrook working with SEMCOG and GLWA Public Affairs to jointly develop an educational campaign. Highlights include:

- A 15-month campaign, made of 3 phases, with multiple steps for each
- Will use a range of media vehicles
- Funded by SEMCOG and GLWA
- The three participating organizations will form an advisory committee and strive to use the resources already within the organizations, in order to be as efficient as possible with funds
- After SEMCOG's funder approves sole source expenditure, Michele will create the project plan and organize the advisory group to create the work plan with metrics, deliverables and evaluation of the program
- The Public Education Work Group and Partners for Clean Water may be asked to review campaign materials

Regional Campaign organizers are also partnering with the Abundance Group - social scientists at Michigan State who specialize in research around education and behavioral change.

2. Educational Resource Package for K-12 Students Update

GLWA has been seeking educational resources about water, particularly for elementary and middle school level educators.

Michele Arquette-Palermo of Cranbrook's Freshwater Forum is developing a teacher professional development package, together with the Western Michigan Environmental Council and Dr. Janet Vail of Grand Valley's Annis Water Resources Institute. Michele will notify GLWA Member Outreach when the digital collection is complete. The target date is June 19, 2018.

August 23, 2018 Meeting Discussion

1. Brochure: Stormwater Management at Home to Protect Drinking Water Sources

The group reviewed the draft brochure and made the following suggestions:

- Consider contacting DWSD for rain garden photos that include a house.
- Pull out EPA 70% statistic to give it more visual emphasis.
- Bullet point some of the text to break it up for readability.
- Change the title to "From Your Yard to Our Waterways".

2. Educational Resource Package for K-12 Students Update

Member Outreach distributed a collection of educational resources, compiled by Michele Arquette-Palermo of Cranbrook's Freshwater Forum. This package titled, *Environmental and Outdoor Education Resource Guide and Teacher-Guided Activities,* includes links to websites, videos, lesson plans, worksheets and activity outlines for students.

October 4, 2018 Meeting Discussion

1. Brochure: Stormwater Management at Home to Protect Drinking Water Sources - Finalized

The final brochure was shared with group. It was reformatted from a trifold to letter-sized flier with less text and more imagery, in order to increase visual appeal. GLWA Public Affairs noted that they may wish to publish the flyer in the One Water magazine. GLWA Member Outreach will share the -partners will share with their audiences (via website, social media channels and at City Halls.)

2. SWIPP Education Efforts

The Public Education team is developing an article on the Huron to Erie Intake Monitoring System for MWEA Matters magazine. Following are highlights about the system and its history, for the article:

- The monitoring network was originally put in place in after 2001 and consisted of a coalition of 14 water treatment plants (WTPs). For years, Macomb County performed maintenance.
- The Coalition received a grant to update equipment, using Sonde probes to measure water quality changes.
- Corridor starts at the beginning of the St. Clair River and extends down to Monroe. Includes Canada's chemical valley.
- GLWA has two facilities participating, Southwest and Water Works Park. GLWA provides water for 40% of Michigan's population. Among the potential threats to the intakes are thirteen chemical pipelines cross the St. Clair river. Further downstream, two pipelines cross the Detroit River near GLWA intakes. All the ships from the Great Lakes Shipping Corridor travel through the monitored area.
- From 2004 to 2013 there were an estimated 700 spills, with another 700 spills since 2014 (includes RTB releases.) Canada's industry self-reports spills.

- Water model being created by MTEC and NOAA will show how quickly a spill would travel from one point to another to measure time to impact the intake. Water operators have been developing the model since 2000.
- Great Lakes Commission is also developing a website on protecting water quality, aimed at public officials to help them make decisions about water issues. The Commission has a team working on spills in the Great Lakes, known as Blue Water Accounting.

December 6, 2018 Meeting Discussion

1. Regional One Water Education Campaign Update

Cranbrook entered into contract with SEMCOG to facilitate the Regional One Water Education campaign. GLWA is also participating and providing funding. Work to date includes: creating campaign timeline and forming an advisory group made of four subgroups. A kick off meeting was held with 28 people from communities and non-profit agencies attending. Following are the highlights of the campaign update:

- Campaign work groups were formed for Marketing, Drinking water, Wastewater, and Stormwater. Subcommittees will meet in January/February to provide key messages for Marketing group to use in developing its multi-media campaign.
- In a change from initial campaign timeline, funds must to be spent by the end of June 2019. The One Water campaign will mimic the Walk Bike Drive Safe program from SEMCOG - a blitz campaign to saturate media outlets over a 10-day period, around Water Week, the first week of June.
- Participating groups include Friends of the Rouge, Clinton River Watershed Council, Huron River Watershed, Erb Family Foundation, City of Ann Arbor, Washtenaw County, St. Clair County, Oakland County, and Macomb County.

2. Public Affairs Update – Michelle Zdrodowski, GLWA

Public Affairs is working on several public education initiatives, including working with a company to create three short documentary-style videos on the One Water concept and the need for all to their part in protecting and preserving this natural resource.

Recap of materials created by PEWG in 2018:

- Annual RTB Report, February, posted on GLWA website
- Protecting Our Waterways Infographic, February
- RTB Report from Jan-April, published in May, May – October published in Dec
- Preventing FOG at Home – distributed via GovDelivery in June, posted on GLWA website
- WWMP Newsletter – one pager, distributed to members via GovDelivery. (Two issues)
- Stormwater at Home flier – one pager, distributed to members via GovDelivery
- SWIPP educations efforts – Huron to Erie Intake article draft for MWEA Matters magazine – Winter 2019 issue

Publication of Articles and Brochures on the Member Outreach Portal

The Public Education Work Group publishes articles on topics of interest to member communities about how GLWA and its member communities manage our water and sewer infrastructure to protect public health and the environment. These articles are published under the *Operation Clean Water* masthead, and emailed to member communities, environmental groups and the media. They are also posted on the outreach portal at outreach.glwater.org. Some articles are sent to MWEA and AWWA Michigan for inclusion in their publications.

One article related SWIPP topics was published:

- *Back and Better than Before: The Huron-to-Erie Real-Time Drinking Water Protection Network.* Posted to the portal and published in MWEA Matters magazine, this 3-page article describes the threats to the drinking water intakes and how the Huron-to-Erie monitoring network will protect drinking water from potential contaminants through its real-time monitoring equipment. The SWIPPs are referenced.

This article is included in Attachment A.

A flier, From Your Yard to Our Waterways: Protect drinking water with smart stormwater management at home, was developed that can be printed and used within and outside the GLWA service area. This flier, in addition to the RTB annual report and Protecting Our Waterways infographic were shared via the Member Outreach portal and were sent to the membership via email. The Public Education Work Group encouraged GLWA member communities and adjacent communities to use these brochures with their customers.

These brochures/fliers are included in Attachment B.

Outreach to Organizations Upstream of Lake Huron Intake

The Public Education Work Group, led by Trude Noble, conducted extensive interviews to better understand water quality educational activities already underway in the area upstream of the Lake Huron Intake. Interviews were conducted with agencies in St. Clair, Sanilac and Huron Counties to learn what they were doing and identify opportunities to share educational materials or collaborate on messaging.

The findings are documented in the report, Opportunities for Expanding SWIPP Outreach Upstream of the Lake Huron Intake, Attachment C, and will form the basis for outreach efforts in 2019 and beyond.

Social Media Posts Through GLWA Facebook and Twitter

The Public Education Work Group collaborated on social media post ideas around celebrated days and holidays. Fifteen posts on SWIPP topics tied to relevant celebrated days and holidays as well as topics featured in the educational fliers were created. All posts are shown in Attachment D.

Educational Resource Package for K-12 Students

The Public Education Work Group charged itself with compiling a comprehensive compendium of educational resources for K-12 students to support water and environmental education. As this was also a goal of Public Education Work Group participant, Michele Arquette-Palermo of Cranbrook's Freshwater Forum, she took the lead, creating an extensive 16-page package of resources. The package is included in Attachment E.

ATTACHMENT A - ARTICLE RELATED TO SWIPP TOPICS

GLWA
Great Lakes Water Authority

Back and Better than Before:

The Huron-to-Erie Real-time Drinking Water Protection Network

"Monitoring first, notifications second," Bari Wrubel states emphatically. As Water Utility Superintendent for the City of Marysville, Wrubel is a leading advocate of the Huron to Erie Monitoring Network, a real-time drinking water monitoring network that protects the public from environmental and man-made contaminants. ■■■■■

Built in 2006, the system is made of a series of water monitoring devices at plants from Port Huron to Monroe, mostly along Lake St. Clair and the Detroit River.

In September 2018, the 14 drinking water plants along the corridor received new monitoring equipment and software to take minute-by-minute readings, looking for changes in the water. This gives operators advance notice of potential problems.

"Reaction time is important," said Wrubel, explaining the need for frequent monitoring and cooperation among drinking water plant operators. "If freighters have a spill, especially on the Canadian side, the notices take a long time, sometimes a couple hours. We don't have a couple of hours. That's why it's monitoring first, notifications second."

The drinking water plants along the 80-mile stretch are Port Huron, Marysville, St. Clair, East China Township, Marine City, Algonac, Ira Township, New Baltimore, Mount Clemens, Grosse Pointe Farms-Highland Park, GLWA-Water Works Park, GLWA-Southwest, Wyandotte, and Monroe. Additionally, network participants formed a public-private partnership with DTE Energy to increase notification and response time along the corridor.

Grant Reactivates Network ■

The network, intended to provide early warning of chemical spills or contamination that could impact the source of drinking water, fell into disuse after five years. It's recently been reactivated, thanks to a $375,000 grant from the Michigan Office of the Great Lakes.

The Southeast Michigan Council of Governments (SEMCOG) will administer the funding, distribute equipment, and provide training to plant operators.

Kelly Karll, SEMCOG engineer, points out that the primary responsibility of all drinking water providers is to protect public health, and catalogs the potential threats looming along the Huron to Erie corridor. "It's a global shipping route, with heavy manufacturing in our own region. 40% of Canada's chemical companies are located there, along with 10 oil and natural pipelines that cross the rivers. There are risks with each of these, and the fast flow of the river makes the timing for spill response challenging."

The risks aren't just theoretical. A report by engineering consulting firm Environmental Consulting & Technology (ECT) says that there were more than 700 chemical spills between 1986 and 2012, most unreported.

Protecting drinking water is the first of five key priorities in our state's comprehensive, ecosystem-based water resource strategy. The Office of the Great

Installed multi-parameter Sonde probe monitors and reports changes in water quality parameters.

ECT consultant Meghan Price holds a monitoring probe in a still from a training video. ECT will provide initial training and ongoing calibration of the monitoring equipment.

Lakes' Michigan Water Strategy report, published in October 2016, emphasizes the importance of monitoring water sources:

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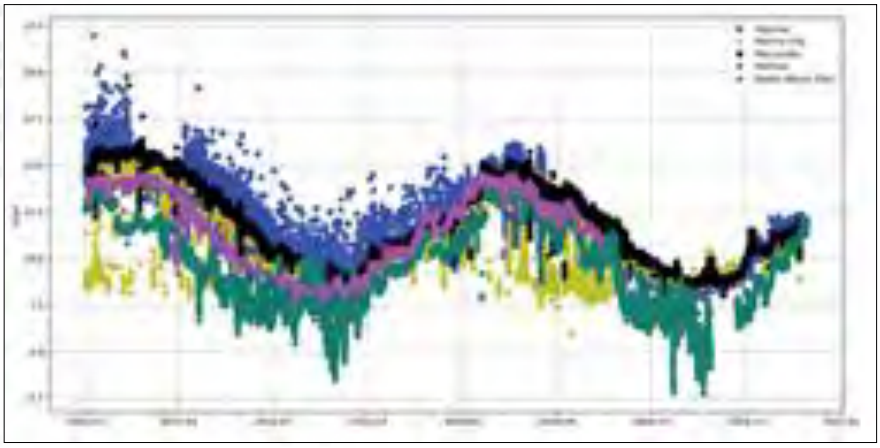

Dissolved Oxygen Measurements (Wayne State University Data Platform).

The ability to achieve Michigan's vision for its water resources depends on a strategic, collaborative ecosystem-based plan that monitors the health and condition of our water resources, invests in water-related infrastructure, uses water more thoughtfully and efficiently to grow sustainable economies, reconnects communities to water and fosters a water ethic and culture of stewardship.

Simple Equipment, Real Time Readings ■

The initial Huron-to-Erie Monitoring Network was a moderate success, but over time, fell into disuse until only a handful of the original participating plants remained. A victim of overly ambitious technology implementation, the early network used equipment that was complex, costly to repair and plagued with ongoing calibration issues. When the grant that funded the original equipment ran out, local budget challenges in many communities limited ongoing equipment inspection, maintenance, and calibration.

Mary Lynn Semegen is the Water Quality Manager for The Great Lakes Water Authority (GLWA), the regional utility which provides drinking water to approximately 40% of the residents in the state of Michigan. Two of the network's 14 drinking water treatment plants are operated by GLWA. Semegen describes the challenges, "The equipment was so sophisticated that plants needed a dedicated person just to maintain it, which isn't workable. Operators have to run the plant."

SEMCOG, which spearheaded the effort to revive the network, made simple equipment a priority in the new iteration. Each plant received a new multi-parameter Sonde, an instrument probe that automatically sends information to computers in the plant. The probe monitors and reports changes in pH, conductivity, temperature, dissolved oxygen, turbidity, and blue-green algae.

The DTE power plant in St. Clair County, located upstream from the East China Township drinking water treatment plant, also received equipment, which was installed at the power plant cooling water intakes. This partnership enhances the network's spill response monitoring activities.

"All the participating utilities can go online to look at each other's data. And there's a model that uses data from the National Oceanic and Atmospheric Administration (NOAA) to visually show how fast a spill is moving," said Semegen.

More Than What's Required ■

Karll and Semegen are quick to point out the plants have continuously monitored their intakes and rigorously tested the water to meet water quality standards, even though some stopped participating in the network. The revived network brings more frequent readings, which allows for more time to react, as well as increased information sharing among the plants and even the general public.

SEMCOG has been involved in the monitoring network since its inception, but will take a more active role in the new iteration, including facilitating quarterly meetings of the participants and working with the Michigan Office of the Great Lakes to seek funding for the long-term sustainability of the program. Participants committed to maintain their equipment and participate in the network for a minimum of five years.

SEMCOG's Karll is optimistic, thanks in part to increased public concern about water quality. "One of our roles is to pull in the Michigan Department of Environmental Quality (MDEQ) and emergency response personnel to ensure a cohesive operation. We're getting strong support from all the stakeholders. Counties and health departments are also participating in the meetings."

Researchers Use Data to Look at Changes in Water Quality ■

Carol Miller is a professor of environmental engineering at Wayne State University (WSU). She's also the Director of WSU's Healthy Urban Waters initiative, "a collaboration of Wayne State University researchers networked with the community to focus on water in an urban setting and future impacts of human culture on community, ecosystem, and economic health."

Miller has been involved in developing a user platform website to download and perform statistical analysis on the data collected by the monitoring network. Below is an example of the type of data that can be retrieved from the platform, showing dissolved oxygen (DO) measurements.

"After the data undergoes quality control, it's made available to the public," Miller explains. "Researchers in the Great Lakes region and beyond use the data to look at changes in water quality over time. They can relate those changes to things that are going on in the corridor and around the ground."

WSU has a group of researchers who've used the Huron to Erie platform, along with climatological data, such as rainfall, temperature, and wind speed to develop a predictive model to predict water quality in response to factors like rainfall.

Beach closures are another application. "Researchers are using it to better understand the quality of drinking water and the contamination of urban beaches. We think that collecting this data will help give us a good picture of what happening when beaches need to be closed for E. coli."

GLWA's Balvinder Sehgal talks to a group at the Water Works Park Pilot Plant, where Wayne State University and GLWA collaborate on research to enhance the drinking water monitoring system along the Huron to Erie Corridor.

Wayne State University used funding from the Erb Family Foundation to help create the interface for the public and researchers.

Through the Healthy Urban Waters initiative, the University aims to make the data available for concerned citizens, to show water quality and changes over time. Miller notes that the data can be used in science, environmental engineering, even data management. "There are a lot of potential uses that haven't been tapped yet."

Committed for the Long Term ■

Marysville was one of a handful of water treatment plants that continued to use the monitoring equipment, even after the original grant expired and other participants dropped off. Water Utility Superintendent Wrubel and his team learned to calibrate the equipment themselves, and switched to self-hosted software to cut costs. He's determined to keep the monitoring system operating.

"To me, it's invaluable. Upstream of us are pipelines, and those pose a risk, but it's also a great day-to-day operational tool. I'll never let the system go. It's worth its weight in gold."

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ATTACHMENT B - BROCHURES RELATED TO SWIPP TOPICS

GLWA
Great Lakes Water Authority

FROM YOUR YARD TO OUR WATERWAYS

Protect drinking water with smart stormwater management at home

STORMWATER

After rains or snowmelt, stormwater flows over driveways, roofs, patios, lawns, sidewalks and streets. Along the way, stormwater picks up fertilizer, pet waste, pesticides, motor oil and dirt, carrying those pollutants to our waterways.

The US EPA estimates that pollutants carried by rainwater runoff account for 70% of all water pollution.

Rather than letting it flow, managing stormwater on your property can help prevent stormwater pollution from reaching our drinking water supplies. (And it can also help keep your foundation and basement dry.)

INFILTRATE, DON'T TREAT

One of the best ways to protect our drinking water supply is to imitate nature, allowing stormwater to infiltrate or sink slowly into the soil rather than running into catch basins or storm sewers.

3 WAYS THAT YOU CAN MANAGE STORMWATER AT HOME

1. RAIN BARRELS

Capture rainwater from your roof and use it later when it's dry outside to give thirsty gardens, flowers and trees a drink.

- Rain barrels help keep excess water out of the sewer system when it rains. They also help prevent rain from becoming polluted stormwater runoff, the biggest remaining threat to clean rivers and lakes in the United States.
- Rain barrels can be purchased at home and garden stores or online and are typically connected to a roof downspout.

Check with your municipality – some offer rain barrels for sale or provide incentives.

2. BE NATURAL

Plant and maintain a buffer of taller vegetation (preferably Michigan native plant species) around the edge of your property and especially near the water to help slow runoff and provide added filtration.

- Native plant species are adapted to local soils, climate and environmental conditions. They need less fertilizer and are more drought and disease resistant.
- Native plants have extensive root systems that cut down watering needs, help infiltrate water back into the ground, minimize soil erosion and filter pollutants from runoff before leaving your property.

3. RAIN GARDENS AND SUSTAINABLE LANDSCAPING

Sustainable landscaping means using plants and soils to slow, spread and soak rainwater where it lands. This reduces the amount of stormwater runoff and helps prevent flooding while it prevents pollutants from reaching our waterways.

GLWA

Member Outreach

FROM YOUR YARD TO OUR WATERWAYS

Protect drinking water with smart stormwater management at home

RAIN GARDENS

Rain gardens are usually constructed on the downside of a slope on your property. These shallow ground depressions use native shrubs, perennials and flowering plants to absorb and filter rainwater in your yard. It is designed to temporarily hold and soak in rain water runoff that flows from roofs, driveways, patios or lawns.

RAIN GARDEN STATS:

- Remove up to 90% of nutrients and chemicals.
- Remove up to 80% of sediments from the rainwater runoff.
- Allow for 30% more water to soak into the ground than conventional lawns.

For rain garden information, tutorials and workshops, check out your local municipality's website or the watershed group in your area.

SOIL CONDITIONING

Compacted soil, such as clay, can be a barrier to absorbing stormwater. Soil must be able to filter and drain water easily.

You can transform your lawn into a stormwater sponge. Healthy lawns help absorb more rain, which reduces water pollution and the amount of water that can get into sewers. Healthy grass develops thick root systems that also help minimize soil erosion.

- Adding organic material, such as compost or mulch, to compacted soil will improve its physical qualities over time so that more water will infiltrate into the ground.
- Spreading compost, soil mixtures or organic material like mulch on your lawn can help create healthier grass with a thicker root system that helps choke out weeds and turns your yard into a water absorbing sponge.

Water moves through the environment into our waterways and is treated by our water treatment plants. Protecting the quality of this source water protects our future drinking water.

Use smart stormwater management at home to reduce stormwater runoff and keep pollutants out of our water sources.

GLWA
Member Outreach

2017 RTB PERFORMANCE ANNUAL REPORT

Operation Clean Water

This is our eighth Retention Treatment Basin (RTB) Performance Annual Report highlighting the operation of satellite treatment facilities in the Great Lakes Water Authority (GLWA) wastewater service area. Called RTBs, these facilities capture, store and treat flows from overloaded combined sewers during wet weather. RTBs protect the Clinton, Detroit and Rouge Rivers and Lake St. Clair from untreated combined sewer overflow (CSO) discharges when it rains.

RTBs are operated by GLWA, Dearborn and Macomb, Oakland and Wayne Counties. RTB operators work diligently to manage their facilities' treatment processes during storms. Their work is critical to the protection of public health and local water quality.

Developed by the Wastewater Best Practices and Public Education Work Groups in the GLWA Member Outreach program, this report highlights the performance of RTBs in 2017. Weather and precipitation data is presented to better understand how specific wet weather events impact our infrastructure. Key RTB operational statistics are presented with insights from individuals who operate these facilities.

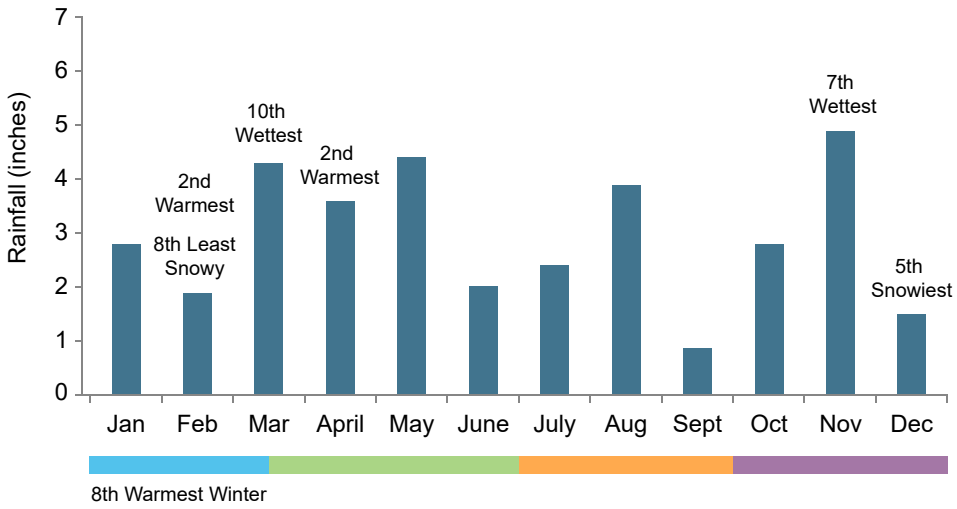
Fairly Even Distribution of Rainfall

Precipitation in southeast Michigan was slightly above average in 2017 and pretty evenly distributed throughout the year. Typically, the wettest month of the year occurs in May or a summer month. For the first time in preparing this report, the wettest month occurred in November with 4.93 inches of rain, as shown in Figure 1.

February was also a standout month from two perspectives. First, it was the second warmest February on record with an all-time high of 70 degrees in Detroit on February 24th. Severe thunderstorms also hit the area that day creating wind damage. Second, February had very little snow.

"While precipitation was closer to average in southeast Michigan, the rest of the state experienced higher than average precipitation," explains Danny Costello, Hydrologist and Meteorologist with the National Oceanic and Atmospheric Administration's (NOAA) White Lake office that compiles data for our region. "The Saginaw Valley and north were way above average, and the Upper Peninsula was even higher with precipitation 12 to 14 inches above average."

Figure 1: Precipitation in the Detroit Metropolitan Area in 2017



The Detroit Metropolitan Area received 35.46 inches of precipitation in 2017, slightly above the annual average of 33.47 inches. Overall, precipitation was fairly evenly distributed without any really wet months. The winter was warmer with less snow and more rain than in years past.

Data source: National Oceanic and Atmospheric Administration

"The two biggest rain events in the state occurred at the beginning of April and the end of July in the Flint and North Saginaw Valley area. Midland almost reached record flood levels and had severe damage," explains Costello.

"November was wet across the southern part of the state, but dry to the north," continues Costello. "There was a three-inch difference from the norm between the two areas that month. Detroit was above average precipitation by two inches and Saginaw was one inch below."

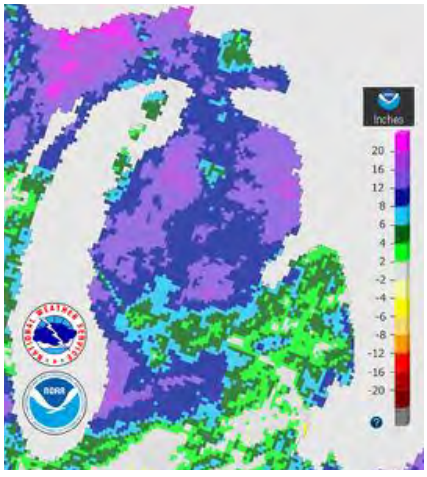
Weather across the country also varied significantly. The midwest and upper midwest regions of the country were dry and the northeast was somewhat dry. The plains and mountain coastal areas were wet. Hurricanes distorted precipitation levels in the south.

As far as temperatures go, Detroit was close to normal with an average of 36.9 degrees for the year. December had very cold temperatures. Flint's coldest temperature ever recorded occurred on December 28 when it was -18 degrees.

RTB Operational Statistics for 2017

There are three types of CSO treatment facilities – retention treatment basins (RTBs), screening and disinfection facilities (SDFs) and treatment shafts – that are collectively referred to as RTBs. Each storm brings a different intensity and duration of rainfall, and a different level of pollutant loadings that RTBs must treat. Operators at these facilities determine how to best treat the flow coming down the pipe to minimize pollutants and residual chlorine disinfectant that will be discharged into our waterways.

2017 Annual Departure Precipitation

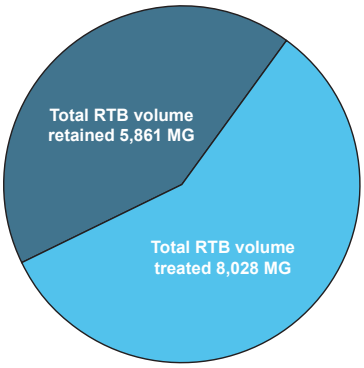


Blue and purple areas show where annual precipitation exceeded the 30-year average by 6 or more inches. Green areas are 2 to 6 inches above average. There were some pockets of above average precipitation along the Detroit River in Detroit and Lake St. Clair.

The volume of flow processed in RTBs, shown in Figure 2, totaled 13.9 billion gallons (BG) this year – 8.0 BG of flow was treated and discharged to our rivers, and 5.9 BG of flow was stored in RTBs, dewatered back into the sewer system and transported to the Water Resource Recovery Facility (WRRF) in Detroit.

While the volume of flow processed in RTBs was lower in 2017 than in 2016, the number of days of operation, as shown in Figure 3, was nearly the same. April had the highest number of days and greatest volume of treated flow from multiple storms as shown in Figure 4. August had the storm that generated the largest volume of flow throughout the tributary sewer system.

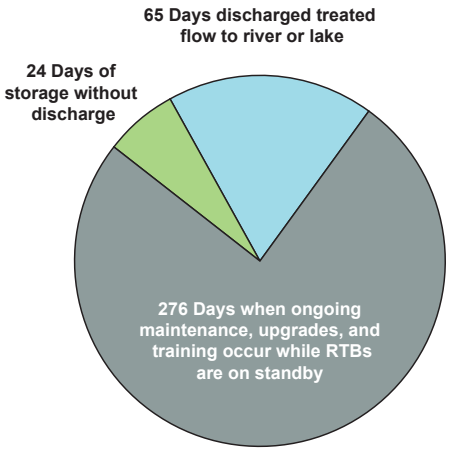
Figure 2: Total Volumes (MG) of Flow Treated and Retained in RTBs During 2017



RTBs protected area waterways from 13.9 billion gallons of untreated CSO discharges throughout the year. This is the equivalent volume of more than 21,000 Olympic-sized swimming pools.

Figure 3: RTB Days of Operation in 2017

RTBs operated on 24% of the days during the year. The remaining 76% of the time, RTBs were ready to go into operation if a storm hit the area.



"We had at least two events every month except for September and December, so there really was no off-season last year," explains Doug Stover, Supervisor of RTBs for the Oakland County Water Resources Commissioner (WRC). "We are used to having a short span of time from December to February or early March where we can pull equipment and do maintenance when it is cold. That didn't happen in 2017 – it continued to rain in February."

"There were a lot of smaller storms during the year," continues Stover. "The only high intensity storms we experienced were in late March and August."

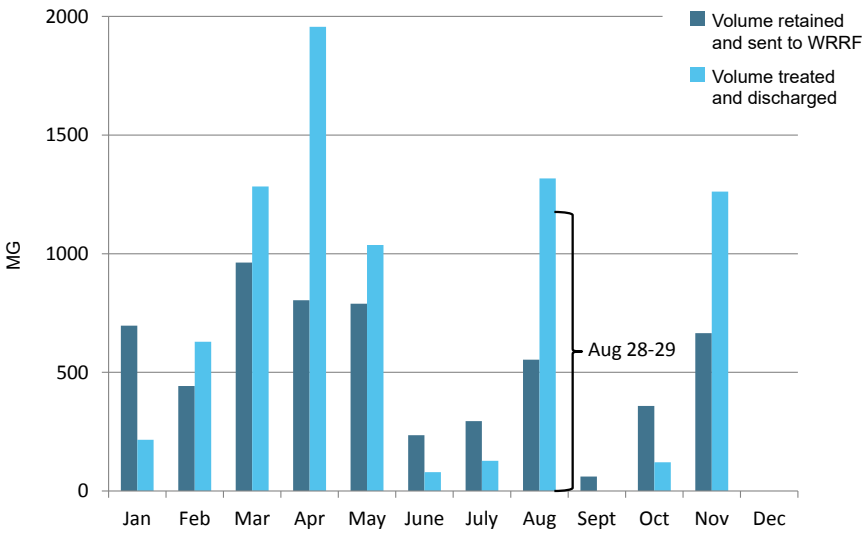
The August 28-29 storm represented nearly all of the treated discharges that month for 11 of the 22 RTBs tributary to the GLWA WRRF.

Figure 5 highlights the performance of seven RTBs with the largest treatment capacities that treated 88 percent of the total volume of flows generated by rain and snowmelt.

RTB Team Additions and Equipment Replacement at GLWA Facilities

"The most memorable part of the year for GLWA was that we beefed up our team considerably," explains

Figure 4: RTB Volumes in Million Gallons (MG) in 2017



Of the total RTB volume generated by storms in 2017, 42% was stored and then treated at the WRRF in Detroit, and 58% was treated in RTBs, SDFs and treatment shafts. Many smaller events triggered RTB operations throughout the year while August had a single event that represented the majority of flows that month.

Figure 5: Performance of Area's Largest RTBs in 2017

Facility Name, Owner	Peak flow rate (MGD)	Number of discharges	Volume of treated discharge (MG)
Conner Creek RTB, Great Lakes Water Authority (GLWA)	8,400	11	2,405
George W. Kuhn RTB, Oakland County Water Resources Comm.	4,350	10	1,146
Baby Creek Screening & Disinfection Facility, GLWA	3,300	19	1,150
Hubbell-Southfield RTB, GLWA	2,080	13	1,687
Chapaton RTB, Macomb County Public Works	1,360	5	109
Milk River RTB, Wayne County Department of Public Services	1,240	14	326
Prospect CSO 117, City of Dearborn	1,210	12	213

The seven largest RTBs in the GLWA wastewater service area discharged 7,036 million gallons of treated flows, or 88% of the total volume of treated discharges in the area.

David McCord, CSO Team Leader. "We took a hard look at what was needed and added two plant technicians, two plumbers and two electricians. This brings our CSO operation and maintenance group up to 18 plant technicians and 13 supporting skilled trade team members."

The increased team kept facilities running and maintained and supported implementation of an equipment replacement program throughout the GLWA RTBs. These improvements include:

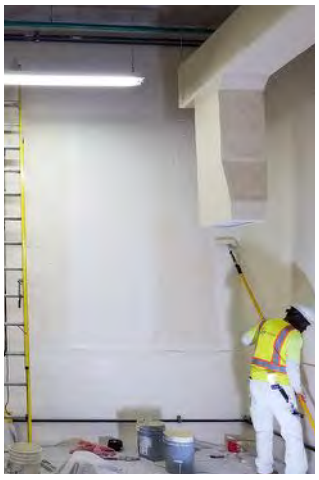
- Added access shaft at the Conner Creek RTB influent channel to lower equipment for cleaning sludge, and replaced five chemical pumps and 20 disinfection mixers;
- Replaced slide gate actuators and bar rack at Seven Mile RTB;
- Replaced sanitary/dewatering pump at Puritan-Fenkell RTB;
- Replaced two new effluent samplers at the Baby Creek SDF;
- Replaced two dewatering pumps at St. Aubin SDF.

"The frequent rain made it difficult to hose down facilities and do the deep cleaning," continues McCord. "Some of our pipe maintenance was pushed to 2018 because plumbers weren't able to get to it, but we made real progress on planned maintenance activities in 2017."

Commitment to Protecting our Waterways

Significant investments have been made in RTBs to prevent the discharge of untreated combined sewage during rain storms and periods of snowmelt. Today, there are 22 RTBs located in the GLWA service area that receive flows from 26 communities. Nine of these RTBs are operated by GLWA and were previously operated by the Detroit Water and Sewerage Department. The remaining 13 RTBs are operated by Macomb, Oakland and Wayne Counties, and the City of Dearborn.

We are proud of the performance of these facilities and the critical role they play in protecting area water quality.



GLWA completed numerous improvements to RTBs and SDFs during 2017, including new access shafts to facilitate cleaning, new chemical pumps with cross connections to provide greater flexibility in pump operation, a new bar rack, and housekeeping work such as painting.

Operation Clean Water features articles on how GLWA and its member communities manage our water and sewer infrastructure to protect public health and the environment. It was created by the GLWA Member Outreach Public Education Work Group. Operation Clean Water is published on the GLWA Member Outreach Portal at outreach.glwater.org.

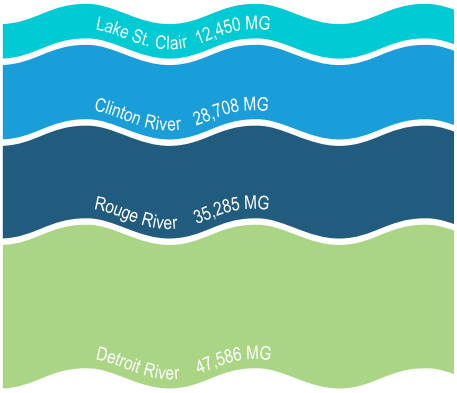
Protecting our waterways

Significant progress has been made over the past two decades in preventing combined sewer overflows (CSOs) from reaching our waterways. Numerous Retention Treatment Basins (RTBs) have been constructed to capture and treat these flows to meet public health criteria established by the Michigan Department of Environmental Quality.

Capacity to Treat CSOs Continues to Grow

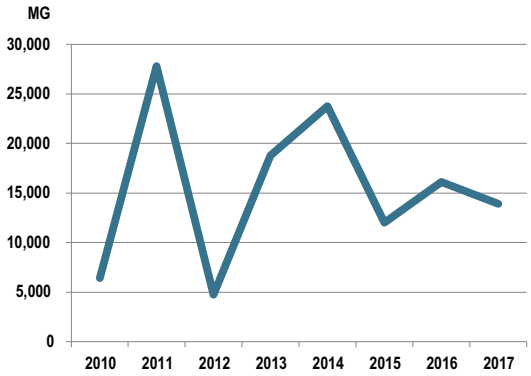
The volume of combined sewage that can be treated by area RTBs in 24 hours has grown to 29,168 MGD. Untreated CSOs have decreased as RTB capacity increased.

Million Gallons of CSO Controlled by RTBs 2010 - 2017



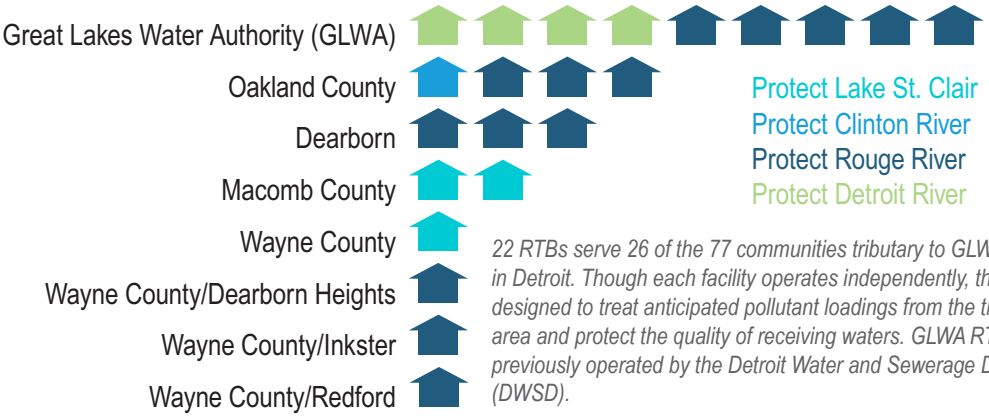
RTBs controlled 124,029 MG of CSO by treating it before discharging to a waterway or storing it until capacity was available at GLWA's WRRF in Detroit.

Wet Weather Flow to RTBs Varies Each Year



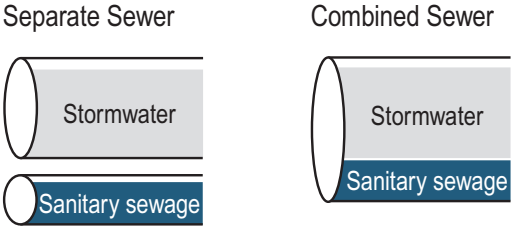
RTBs provide additional treatment capacity in the sewer system when needed during storms and when snow melts. This volume varies each year with the weather but the results are the same – untreated CSOs are prevented from reaching our waterways.

RTBs Within the GLWA Wastewater Service Area



22 RTBs serve 26 of the 77 communities tributary to GLWA's WRRF in Detroit. Though each facility operates independently, they are all designed to treat anticipated pollutant loadings from the tributary area and protect the quality of receiving waters. GLWA RTBs were previously operated by the Detroit Water and Sewerage Department (DWSD).

Why RTBs are Needed



RTBs capture and treat excess flows from older combined sewers that transport stormwater and sewage in a single pipe. As sewer flow volume increases during storms, RTBs begin operations to handle these additional stormwater flows that overload the sewer system.

RTB Operator Collaboration

Operators from GLWA and wholesale customers formed the Wastewater Best Practices Work Group that has been collaborating for 13 years to develop and implement best practices for RTB operations.

Operation Clean Water

glwater.org

March 2018

ATTACHMENT C - OPPORTUNITIES FOR EXPANDING SWIPP OUTREACH UPSTREAM OF THE LAKE HURON INTAKE

GLWA
Great Lakes Water Authority

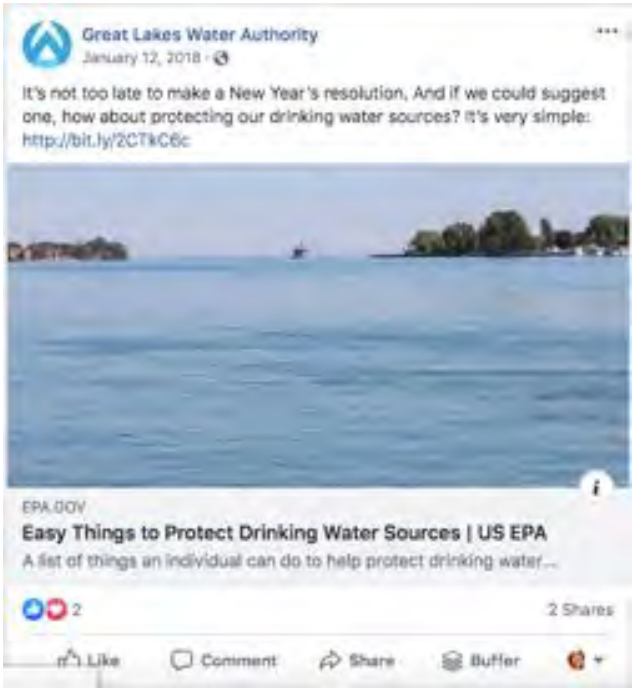
ATTACHMENT D - SOCIAL MEDIA POSTS

GLWA
Great Lakes Water Authority

SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS

Actions to Protect Source Water



Septic Tank Best Practices

Protect Source Water for World Water Day

Source Water Education for Youth

SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

SWIPPs for Source Water Protection

Drinking Water Week Post

Drinking Water Week Education

Drinking Water Week Youth Education

SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

Great Lakes & Fresh Water Week Education

Community Educational Event

Green Infrastructure to Protect Source Water

Green Infrastructure to Protect Source Water

SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

Green Infrastructure to Protect Source Water

ATTACHMENT E - EDUCATIONAL RESOURCE PACKAGE FOR K-12 STUDENTS

GLWA
Great Lakes Water Authority

RESOURCES

These resources offer much more information about the subject.

Websites

- Webpage of teaching resources about water
  - http://www.ericdigests.org/2004-1/ecosystems.htm
  - Animated water cycle diagram
  - Down the Drain: How much water do you use?
  - What is your water footprint? https://www.watercalculator.org/wfc2/q/household/
  - USGS Water Resources https://water.usgs.gov/edu/teachers-water.html
- Local Resources
  - http://flintriver.org/blog/?s=GREEN
  - http://www.grandlearningnetwork.org/educators-grand-learning-network.html
- USGS Water Cycle Overview:
  - *http://ga.water.usgs.gov/edu/watercycle.html*
  - EPA Water Cycle Animation: *http://www.epa.gov/ogwdw/kids/flash/flash_watercycle.html*
- Michigan Watershed Map (PDF):
  - *http://michigan.gov/documents/deq/lwm-mi-watersheds_202767_7.pdf*
- How we use water:
  - *http://environment.nationalgeographic.com/environment/freshwater/embedded-water/*
- Michigan Environmental Education Curriculum Website
  - http://techalive.mtu.edu/meec_index.htm
- Michigan Natural Features Inventory
  - http://mnfi.anr.msu.edu/
- Center for Watershed Protection
  - *http://www.cwp.org/*
- *The United States Environmental Protection Agency has groundwater and drinking water activities and lesson plans*
  - https://www.epa.gov/ground-water-and-drinking-water/drinking-water-activities-students-and-teachers
- *EPA resource for activities and lesson plans on water usage and conservation*
  - https://www.epa.gov/watersense/watersense-kids#tab-2

Video

- *"After the Storm" If you would like to order a free copy of the video, please call the National Service Center for Environmental Publications (NSCEP) at 513-489-8190 or 800-490-9198 or send an email to ncepimal@one.net. When you request a VHS copy of the "*After the Storm*" (VHS), please refer to EPA document number: EPA 840-V-04-001.*

ACTIVITY IDEAS :
Research which watershed you live in.
Visit the river or lake that pollutants would drain into and see if any evidence of pollution exists by performing water quality tests.
Find storm drains that lead to this water source and label them as draining to stream/lake.
Find out where your waste water treatment plant is and the source of your drinking water.

What's so great about the Great Lakes? (*adapted from MEECS Water Quality Unit*) As students enter the classroom have them answer the question," What's so great about the Great Lakes?" posted on the white board with lots of markers available. Students should write their response to that question or draw a picture on the board. Make a bar graph on the board and label each column with one of the Great Lakes. Tell students to place a self-adhesive note in the column for each lake that they have visited (HOMES): Huron, Ontario, Michigan, Erie, and Superior. Which lake was most visited by students? Which has had the least visits?

Students assess how much water they use daily prior to the program. Online water use calculator.

Students assess how much water their family uses by completing a water conservation worksheet. Available for download at:
https://www.epa.gov/sites/production/files/2017-02/documents/ws-ourwater-drop-table.pdf

Students complete the worksheet, "Matching Game How Much Water?"
Available for download at:
https://www3.epa.gov/safewater/kids/pdfs/activity_grades_4-8_funfactsmatchinggame.pdf

Have students collect data about how much water they use daily **after** implementing water conservation measures for a week. Have students compare and contrast water use before and after water conservation measures by comparing the worksheet or results of the online water use calculator.

LESSON PLAN

Save Kearsley Creek

Summary

Students conduct a mock public hearing to make a group decision on an important project. This introduction may encourage students to attend and participate in this part of the democratic process at some time in their lives. Students will learn that every voice makes a difference.

Objectives

Students will:

- describe the process of a public hearing.
- analyze some effects of a development on an adjacent wetland.
- weigh factors in a proposed building project and decide whether or not to proceed.

Background

When someone wants to build on or alter wetland areas, he or she must first apply to both the state and the federal governments for a permit to do the work. Representatives of government agencies will visit the proposed project site, determine where the wetland boundaries lie, and assess the ecological functions and social and wildlife values of the wetland. Before each agency makes its final decision on whether or not to issue a permit, the project will go out on public notice. Public notices may be posted in the local newspaper and in local offices and libraries. Any individual can request a hearing to be held to discuss all relevant issues surrounding the project. At the hearing, involved agencies are represented and their testimonies presented. Citizens may sign up to testify or give their views on the project as well. Citizens' statements really matter and will become part of the public record! Points brought out during the hearing will be used by the agencies in decision-making.

Procedure

Warm Up

Give the class a brief background on public hearings. The play in this activity depicts a public hearing on a proposed building project in a wetland. Although the case is fictional, the process of the hearing and the nature of the testimonies are realistic. Decisions are normally not made at the hearings, but at the end of this hypothetical scenario, students will discuss the issues and reach a group decision on the project's fate

Materials

1-Copies of script for students assigned to roles.

2- Copies of the site plans and maps for everyone to review

The Activity

1. Review the proposal, then assign the roles in the play. Students who do not play a part will represent

the hearing audience and take the lead in the final decision-making process as a “hearing committee.”
2. Have the class perform the hearing.

Wrap Up and Action
After the performance, give students time to discuss the case as a group or in small groups, or lead a class discussion. Have students present decisions to the class, including revisions to the proposed project.
Students should be encouraged to make their own recommendations, and there are certainly no right or wrong answers. However, the goal is to come up with a compromise plan that does the most good for the greatest number of people and the environment.

Whenever possible, avoid building in the wetland itself. For example, move the building and parking lot back from thebrookarea (see diagram). This would make the walk from the building to the parking lot longer, but it would also save most of the wetland area, protect the creek, and give residents a nice view of wildlife. The building may also need to be a bit smaller. This entire plan would cost less. After the building has been completed, develop an interpretive trail around the wetland for community use. This would allow citizens continued access for fishing, birdwatching, etc. Involve residents of the facility in on-site wetland education programs for area youngsters. .

The Characters:
A Hearings Officer Mr. Stan Ref Furee, ,the judge who will preside over the hearing.
Mr. John Cleandrane from the county’s drain commissioners office
Ms. Kathy Landenwater of the state’s Department of Natural Resources (DNR)
Mr. Roger Greatlakes of the state’s Department of Environmental Quality (MDEQ)
Ms. Susan Fowlenfish of the U.S. Fish and Wildlife Service (USFWS)
Ms. Lauren Waters of the U.S. Army Corps of Engineers (USACE)
Mr. Final Decision of the U.S. Environmental Protection Agency (USEPA)
Ms. Zachare Iluvfish of the National Marine Fisheries Service (NMFS), an agency of the National Oceanic and Atmospheric Administration (NOAA)
Ms. Iva Gotcash , the permit applicant (the would-be owner of the rest home to be built)
Mr. Austin Hammer a builder (has been contracted by Ms. Gotcash to build the rest home)
Mr. and Mrs. About To-retire, the current owners of the land in question
Ms. Eco Growth from the state’s Bureau of Economic Development
Mrs. Frog E. Lover a member of a local conservation group trying to save Kearsley Creek.
Mrs. Josephine Arquette, an elderly woman and potential resident of the rest home
Mr. Theodore Nimby, a resident of the neighborhood near the project site
Mrs. Karen Sweet and her seven-year-old granddaughter Frances, area residents who are birdwatchers
Mr. Joe Gotaplan, an interested citizen who is trained and employed as a wetland/environmental consultant

The Scene:
A large, plain-looking meeting room. There is a long table at the front of the room with several chairs behind it. The rest of the room holds rows of folding chairs for an audience. A table near the doorway holds a sign that instructs people to enter their names in a notebook as they arrive, to record the hearing's attendants. Anyone who wishes to speak at the hearing must also place his or her name on a list posted on the wall.

[Several people are beginning to file into the room. They stop to read the sign and dutifully scribble their names in the book and on the list. Many are quiet and serious-looking; others are chattering to each other in near whispers, hurriedly fitting in last-minute instructions. All take their seats as a stately, impressively dressed man enters and sits at the table in the center chair (he is the Hearings Officer, Mr. Stan Ref Furee). The agency representatives seat themselves beside him at the table. The Hearing Officer speaks:]

The Script:
Hearings Officer (H.O.): If everyone is ready, I will open the meeting. We are here this evening to hear testimony on the proposed Turtle Haven Senior Center building project. This hearing was requested by a member of the community in response to public notice number 32456-flow. The applicant, Ms. Iva Gotcash, has submitted permit applications to the Corps Of Engineers and the state Department of Natural Resources and Department of Environmental Quality. The agencies have indicated that the applications are complete and correct and that their project managers have visited the site. We will hear their assessments this evening, and testimony from the applicant, involved parties, and interested citizens.

[He holds up the drawings of the project site and building plan and points to the described features.]

The project site in question is a 8-acre parcel of land containing 3.75 acres of wetland with a brook running through it. The application states that six of the eight acres are to be cleared of vegetation and the wetland and brook are to be filled in with clean fill-dirt. A pipe would be installed below ground to carry water from the brook through the property, so as not to interrupt the flow. The building is a senior center with 200 units (living quarters for 200 individuals or couples, maximum occupancy 300 people). Included is a general dining facility and a sunroom and deck. A paved parking lot and access drive are to be placed to the southwest of the building. The main building and maintenance buildings would cover approximately two acres. The parking lot is another 1.5 acre, and the access road traverses .95 acres on the parcel.

Are there any questions on the project as explained?

[Waits. There are no questions.]

I would like to invite the resource agencies, seated here at the table, to present their testimonies on the case. I will remind the audience that no decisions have been made on the permit applications. The agency representatives are merely stating how they currently stand on the proposed project and why.

May we have the first speaker, please?

Ms. Landenwater: I'm Ms. Kathy Landenwater from the state's Department of Natural Resources. We have some reservations about the project as proposed, because of the effects it will have on the quality of the waterway. The construction and clearing of plants from the site would destroy the filtering ability of the existing wetland, and would send more sediment and pollutants into the stream. This will dirty the water, smother fish eggs, and kill aquatic insects. The paved parking lot and the building's rooftop would cause a lot of runoff to enter the stream. Without the plants to slow down the flow of water from the land, the rate of flow of the stream would be greatly increased. The lack of vegetation would also mean that the stream would no longer be shaded. With direct sunlight hitting it, the water's temperature will increase. Both the temperature change and the flow increase will be harmful to the trout that live and spawn in that stream. We can't afford to lose valuable trout habitat.

H.O.: Thank you, Ms. Landenwater. Could we hear from the other state agency now?

Mr. Greatlakes : Yes! My name is Roger Greatlakes I represent the Department of Environmental Quality.. I'm the project manager on this case and I'll be making the decision on whether to issue the permit. Our first inclination is to deny the permit as applied for, BUT we feel that alternatives exist that would make the project more environmentally sensitive. We would be more likely to approve the permit if efforts were made to reduce the wetland damage. One way is by moving the building back away from the stream and into the upland area. Some wetlands would still be affected, but not as many. The parking lot should also be set back farther away from the wetland area. This would mean a longer walk from the parking area to the building, but it would save substantial wetland area.

H.O.: Thank you, Mr. Great Lakes. Let us now here from the Drain Commissioner

Mr. Cleandrane: I'm John Cleandrane from the County Drain Commissioners office. Our office is here to make sure our water resource is protected and to ensure laws and regulations are followed. If the state and federal offices do issue the permits my office will make sure the grantee utilizes proper erosion control methods.

H.O.: Thank you, Mr. Cleandrane. Let us now hear from the US Fish and Wildlife Service

Ms. Fowlenfish Hi. I'm Ms. Susan Fowlenfish . Basically, the Service agrees with Ms. Landenwater about the trout population. In addition, several other valuable wildlife species have been observed using the site as both a feeding and nesting area. Those animals include the Blanchard's cricket frog, Cooper's Hawk, Marsh wren, Spotted and Blandings turtle, Smallmouth salamander, and others. In the last year, two bald eagles were seen in the area. This type of habitat is becoming scarce in our region, due mostly to development. We need to protect what is left of wetlands like this one. All efforts should be made to minimize disturbance to the wetland. I think that there are ways to do that, and Mr. Greatlakes of the

DEQ has mentioned some of those.

H.O.: The National Marine Fisheries Service is another federal agency reviewing the case.

Ms. Iluvfish : Uh, yes. I'm Zachare Iluvfish from National Marine Fisheries. The assessments of the other agencies have been stated very well, particularly that of the DEQ (uh, that was Mr. Greatlakes, I believe). One of our main interests is what happens to commercially important fish and shellfish. It is true that the trout population would be threatened by the project as proposed. Our agency does not predict much of an effect on commercial fisheries, except that the increased sediment load from construction could eventually reach the fishing areas downstream. If the water-quality issue is addressed by means of sediment control, then we would not object to the project.

Mr. Hammer: Excuse me, please. May I ask a question?

H.O.: Yes, please do, but only a question—you must register to speak.

Mr. Hammer: Yes, thank you, and I believe I will be testifying later. Ms Iluvfish , what sort of sediment control measures would help keep the stream clean?

Ms. Iluvfish: Well, normally, in construction projects, a stormwater retention basin is called for. This would collect runoff and allow sediment to settle to the bottom. The sediment would be trapped in the basin, while the cleaner water would flow out through a pipe near the pond's surface.

Ms. Landenwater: Yes, that's true, but remember that in this case we're talking about a trout stream. Water sitting in a shallow pond like that would heat up quickly. Then we'd have more problems for the fish. A better idea would be to install infiltration trenches. These are basically boxes that are built into the ground. They allow the runoff to filter down into the round before it gets into the stream. This actually cools the water off and filters out the sediment and pollutants. If the area around the trenches is planted with vegetation to add more filtering ability, then the problem would be well taken care of.

H.O.: Thank you. We should move on now. There are two more federal agencies here tonight.

Ms. Waters: I'm Lauren Waters from the Army Corps of Engineers [clears her throat loudly]. The Corps is actually the deciding factor, here, for the federal government. We will be issuing or denying the permit under the Clean Water Act. We have not made our decision, as yet, but are taking all of these issues into account, including comments from the public. We will balance the public benefits against the natural resource losses and try to arrive at a fair decision. That's all I have to say for now.

H.O.: And finally, Mr. Decision..

Mr. Decision: Good evening. I am Final Decision from the U.S. Environmental Protection Agency, or EPA. For those of you who are not familiar with our role in this process, I will explain. EPA relies on the reports from the Fish and Wildlife Service and National Marine Fisheries for information about the project's impacts on natural resources. We have the ability to override the Corp's decision on the application, and

I feel that we would not allow the Corps to issue the permit as it stands. I recommend that the applicant pay careful attention to the recommendations made here tonight. The senior center would be a valuable asset to the community, if the project is managed well with respect to the environment.

H.O.: Thank you, all agency representatives. Now I would like to open the floor to those members of the public who have signed up to speak. May we have the first speaker?

Ms. Iva Gotcash : I am Iva Gotcash, the applicant. I felt I should make my presence known. I think everyone knows where I stand on this project. I have a lot of money at stake here. The project was designed this way because I felt that it would remove the hazards posed by the wetland—you know, mosquitoes, bad odor, and so on. But if you all think the marsh has some value, I'm willing to listen to suggestions to improve the project. I have to, or I won't get my permit.

[The crowd chuckles.]

Mr. Hammer: Austin Hammer, here. I'm the builder, hired by Ms. Gotcash. I need to know what I'm supposed to be responsible for in this project. These safeguards you're talking about could cost a lot of money and time. I need to keep costs down for my client. I already counted on putting up silt fences to catch the eroding soil—that's common practice for my people. I need to know where it's okay to cut down trees and where I can and can't drive my equipment.

Mr. and Mrs. About To-retire: We're the current owners of the property in question. We've agreed to sell the land to Ms. Gotcash. We were going to give the property to our daughter, but she was transferred to another state for her work. We can't afford to pay taxes on the land, and we need the money from the sale for our retirement. If Ms. Gotcash doesn't get her permits, she won't buy the land, and we'll be stuck!

My name is Ms. Eco Growth and I work for the state's Bureau of Economic Development. Frankly, I think we can't afford not to have this senior center built! The housing situation for the elderly in this area is poor. With this new facility, we'll have a better draw for more types of people to the area, which also means more consumers and a better economy. And think of all the visitors who will come here to see their loved ones and spend some money while they're here! It's something we've needed for a long time.

Mr. Nimby: I'm Theodore Nimby. I live in the adjoining community. I have two small children. The traffic in our area is bad enough as it is. Bringing more people to the area will worsen the situation. I moved here to give my kids a nice, quiet lifestyle. Now I'm worried about them getting hit by a car! And I know how long these construction projects take. We'll have noisy tractors and such disturbing us for months! What do I say to this project? Not in MY backyard!

Ms. Frog E Lover : Hello, everyone. I'm Frog E Lover I belong to Save Kearsley Creek. We are very disturbed at the prospect of destroying such valuable wildlife habitat. The home should be built in another location, and the area sold as reserve land. Keep it protected, for the wildlife. Wetlands are critical to maintaining clean air and water. Our children need a healthy environment! I say, stop the

project altogether!

Mrs. Sweet: I'm Karen Sweet. This little girl herewith me is my granddaughter, Frances she is seven

[Frances waves, beaming at her grandfather proudly.]

Every Sunday Sally-Frances and I go to the marsh there and birdwatch. It's a nice, quiet place to spend some quality time with the little one—you should all go there some time! Well, I understand that everybody's got their reasons for wanting to use the land more profitably, but isn't there some way that they can do that and still keep a nice place for me and Frances and the birds? Maybe they could build around the marsh. That's all I wanted to say.

Mrs. Josephine Arquette

[She moves very slowly and takes a while to reach the front of the room.]

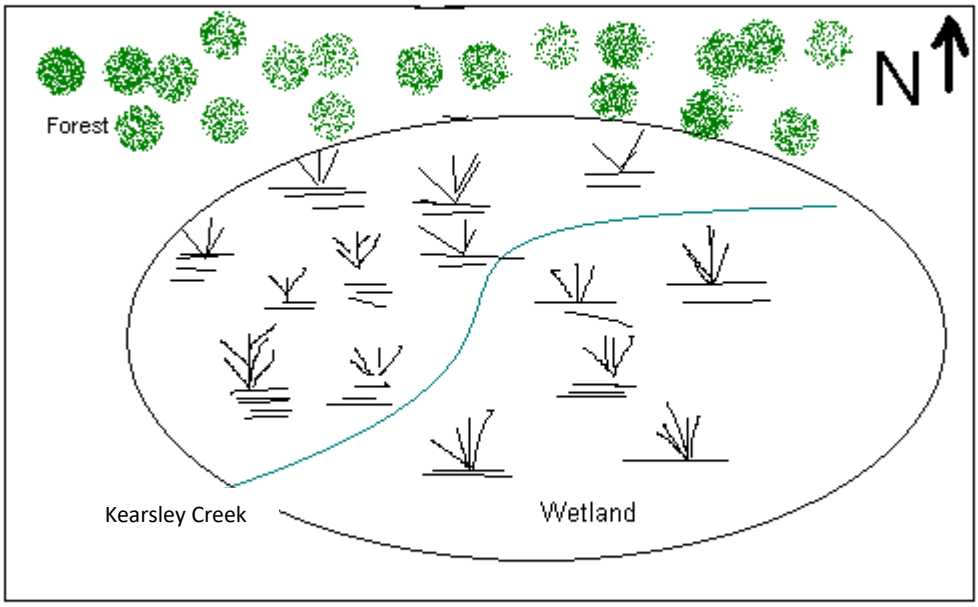
My name is Josephine Arquette. I'm 86 years old. My hearing is lousy and my eyesight is going. They don't let me drive anymore. I've been living alone since my husband died. I don't want to live alone any more . I've already got my place in line for one of those apartments in Turtles Haven. That would give me back some feeling of independence. I like the project just as it is. I don't need to be walking a long way from the parking lot to the building. It'd make me not want to go places when my family comes to visit and take me out. Other than that, just build the danged place so I have somewhere to live!

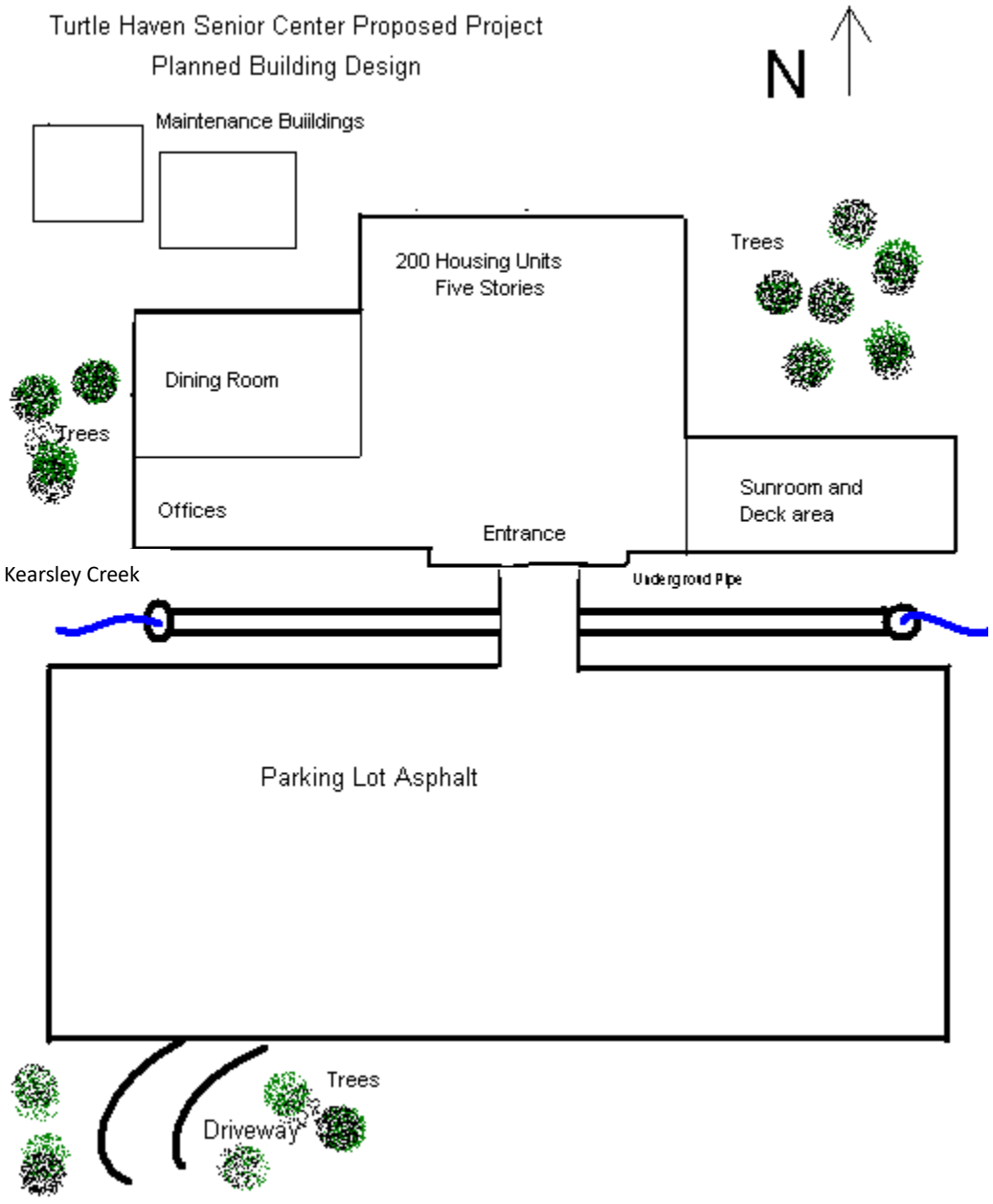
Mr. Gotaplan: I am Mr. Joe Gotaplan. I'm here this evening as an interested citizen, but I am employed as a wetland and environmental consultant. I'd like to make a few comments. First, Mrs. Arquette. There is a sun room and deck planned for the east wing of Turtles Haven . Would you be happy looking out at a parking lot? Wouldn't you rather have a view of a natural area? If the building is set back as the gentleman from DEQ suggested, this could be incorporated into the plan. Ms. Gotcash, if you want to save money on construction, do not choose to fill in the wetland! This is very expensive, and the ground will not be very stable over the long term. It could sink! If you make the building a bit smaller, say 175 units instead of 200, you would harm a bit less wetland area. You might not make as much money on the housing, but it's a small price to pay. Certainly, the best alternative would be to put the building somewhere else completely, but a compromise on all sides is not impossible.

H.O.: Since Mr. Gotaplan was the last speaker, I will remind everyone that all testimony presented here is now part of the public record and will be used in deciding this case. After the permitting deadline, the public may contact the agencies to find out about the outcome of the case. I thank you all for coming. The hearing is adjourned.

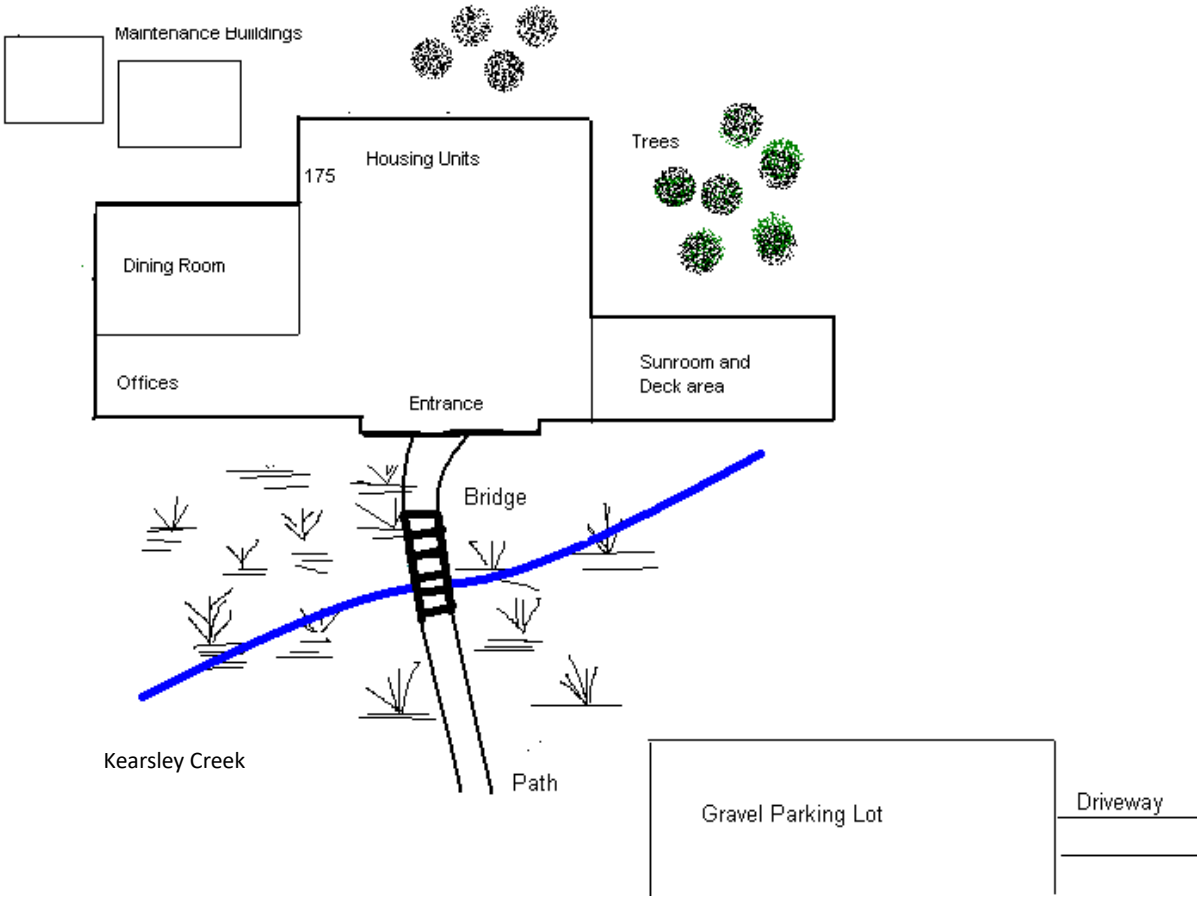
H.O.: Since Mr. Gotaplan was the last speaker, I will remind everyone that all testimony presented here is now part of the public record and will be used in deciding this case. After the permitting deadline, the public may contact the agencies to find out about the outcome of the case. I thank you all for coming. The hearing is adjourned.

Turtle Haven Senior Center Proposed Project
The Project Site -Existing Natural Features




Turtle Haven Senior Center Proposed Project
Planned Building Design
N
Maintenance Buiildings
200 Housing Units
Five Stories
Trees
Dining Room
Trees
Offices
Entrance
Sunroom and
Deck area
Kearsley Creek
Underground Pipe
Parking Lot Asphalt
Trees
Driveway

Turtle Haven Senior Center Proposed Project
The Project Site
Revised Design Option



GLOSSARY:

Aerial photo: Photo taken from above, either flying overhead or from a satellite.
Algae: Simple, photosynthetic aquatic plants that lack true roots, stems, leaves.
Algal blooms: Extensive growth of algae in a body of water, often due to increased nutrients such as nitrates and phosphates. The decomposition of the dead algae requires oxygen, often depleting available supplies.
Animal wastes: Pet, livestock, or poultry wastes.
Aquatic: Having to do with water; for example, aquatic ecosystem.
Atmosphere: The entire mass of air surrounding the Earth.
Benthic: Of, or pertaining to, the collection of organisms living on or in sea, lake, river or stream bottoms.
Best Management Practices (BMPs): structural, vegetative, or management practices designed to control, prevent, remove or reduce pollution.
Catchment: A catching or collecting of water, especially rainwater; a basin or structure used for collecting water.
Clean Water Act: Passed in 1972**,** it is the cornerstone of the surface water quality protection in the United States with the goal of *restoring and maintaining the chemical, physical, and biological integrity of the nation's waters* in order to support "the protection and propagation of fish, shellfish, and wildlife and recreation."
Combined Sewer System*:* A system of pipes that collects both stormwater *and* household wastes and transports them to a wastewater treatment plant. Combined sewer systems may fill to capacity during large precipitation events, resulting in untreated sewage being discharged directly to rivers or lakes.
Commercial : Having to do with businesses or places of commerce that provide a product or service, such as motels, hotels, restaurants, stores, malls, etc.
Conservation: Careful and efficient use of a natural resource.
Consumptive use: That part of water withdrawn that is evaporated, transpired by plants, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the local environment.
Contaminant: A substance of natural or human origin found in the air, water, or land that causes harm.
Culvert: A pipe that water moves through, typically providing passage for a small stream under a road.
Direct water use: Water used for drinking, cooking, cleaning, irrigating, etc
Discharge: The volume of water that passes a given location within a given period of time, usually recorded in cubic feet per second.
Dissolved oxygen: The amount of oxygen in water that can be used by animals and plants.
Drainage basin: The land area that precipitation or snowmelt runs off to a particular stream, river, or lake. A drainage basin is also called a watershed. Large watersheds, like the Mississippi River basin, contain many smaller sub-watersheds.
Drainage divide: Highest point or ridge separating two watersheds.
Effluent: Water that flows from a sewage treatment plant after it has been treated.
Elevation: Height above sea level.

Erosion: The wearing away of land surfaces by running water, wind, or glaciers. Erosion occurs naturally from weather or runoff, but can be accelerated by land clearing practices, such as residential, commercial or industrial development, road-building, timber cutting, or other activities.
Eutrophication: The enrichment of water with nutrients, usually phosphorous and nitrogen, which stimulates the growth of algal blooms and rooted aquatic vegetation.
Fertilizer: A substance that promotes the growth of plants on land or in the water. Usually contains nitrogen (N), phosphorus (P), and potassium (K).
Fecal coliform: Bacteria that are found in excrement (animal wastes) or sewage contamination, occurring naturally in the digestive tract of humans and animals to aid in the digestion of food.
Flood: When water exceeds the capacity of the channel and overflows onto land next to a stream or river not normally covered by water.
Flood plain: Flat area adjacent to a stream channel that is periodically covered by flood overflows.
Gradient: Change in vertical elevation over a specific horizontal distance.
Headwaters: The source or beginning of a stream or river.
Hydrology: Study of the quantity, distribution, movement, and effects of water on the Earth's surface, in the soil and underlying rocks, and in the atmosphere.
Impervious: Not allowing water to pass through.
Indirect water use: Human use of products that required water to grow or manufacture them.
Industrial: Having to do with the extraction of resources or the manufacture of goods, such as steel, chemicals, paper and petroleum refining.
Infiltration: Movement of water from the land surface into soil or groundwater.
Land Use: The way humans use the land, such as industry, residential, commercial, recreation, etc.
Macro invertebrate: An organism that does not have a backbone and is large enough to be seen by the unaided eye.
Meander: A curve in a stream. Also called sinuosity.
Mouth: Site where a stream or river empties into a larger river, lake, or ocean.
Municipal: Having to do with a city.
Nitrates: A form of nitrogen plants can take up through roots and use for growth
Non-point source pollution*:* Pollution whose sources cannot be traced to a single point, but whose pollutants reach water bodies in runoff. Ex. pesticides and fertilizers running off lawns and farm fields, animal wastes from farms, dirt and oil on roads that runs into lakes and streams after a rainstorm, etc.
Nutrients: Substances (ex. N and P) that promote plant growth.
Peak flow: The maximum discharge of a stream or river at a given location.
Pervious: Allowing water to pass through or seep into.
Pesticide: A substance or mixture of substances used to kill a pest, for examples, insects or unwanted plants (weeds).
Point source pollution: Pollution, or pollutants, that can be traced to a single source, such as discharge from a factory, combined sewer overflow, a person dumping used motor oil into a lake, etc.
Pollutant: Any substance introduced to the environment that adversely affects the usefulness of the resource.
Precipitation: Any form of water, such as rain, sleet, snow or hail, which falls to the Earth's surface.
Public water system: A water system that has at least five service connections, or which serves 25 or more individuals for at least 60 days per year.

Rain garden: An attractive landscaping feature planted with perennial native plants planted in a bowl-shaped garden that is designed to absorb stormwater runoff from adjacent impervious surfaces such as roofs or parking lots, in order to reduce the amount of untreated storm water reaching streams, rivers and lakes.
Raw sewage: Untreated human wastes.
Residential: Having to do with where people live.
Riparian area: Land adjacent to a stream or river that supports a greater diversity of plants and animals due to the greater availability of water and higher water table.
River: Flowing water of considerable volume, larger than brook, stream or creek.
Runoff: Precipitation or snow melt that travels over the land surface to enter streams, rivers, lakes and storm drains.
Sanitary sewer: System of pipes that transports human wastes from households and commercial establishments.
Sediment: Earth material that is carried into a stream that is either deposited on the stream channel bottom or suspended in the water.
Septic system: System that includes a tank for holding household wastes that allows the settling of solids prior to distribution to a leach field for soil absorption.
Sewer: A system of underground pipes that collect and deliver wastewater to treatment facilities.
Stewardship: To take care of something.
Storm drain: Collects storm water runoff and transports it to a lake or river.
Storm sewer: A sewer that carries surface runoff and snow melt from the land, completely separate from those that carry domestic and commercial wastewater (sanitary sewers) to a wastewater treatment facility.
Storm water: Water runoff after a storm or precipitation event.
Stream: A channel with defined bed and banks that carries water during all or part of the year.
Stream flow: Water flowing in a natural channel, also called discharge.
Sub-watershed: Land area that drains runoff to a stream that is a tributary to a larger river or lake and its watershed.
Surface water: Water that is on Earth's surface, such as in a stream, river, lake or reservoir.
Tributary: A stream or river that flows into a larger stream, river, or lake.
Turbidity: A measure of the clarity of water.
Wastewater: Water that has been used in homes, industries or businesses that is not for reuse unless treated.
Water quality: A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability to a particular use.
Water quality standards: Standards established by the EPA to protect public health by limiting the level of contaminants allowed in drinking water.
Water use: Water that is used for a specific purpose, such as for domestic use, irrigation or industrial processing.
Watershed: The region draining into a river, river system or other body of water. All of the area of land that drains to a particular body of water.
Benthic: Pertaining to the bottom of a body of water

Combined Sewer System A sewage system that collect both storm water and sanitary wastewater in the same sewer are known as combined sewers. During wet weather conditions or heavy rains combined sewers do not have enough capacity to carry all of the storm water to the treatment plant. In this case, the combined storm water and sanitary waste water overflows untreated into a body of water, creating a combined sewer overflow.
Ecology: the study of interactions between organisms and their environment.
Effluent: Waste material discharged into the environment.
Hydrology: Study of the distribution, circulation and properties of water
Non-point source pollution: Pollutants that enter waterways from broad land areas as a result of the way the land is used.
Point-source pollution: Air or water pollutants entering the environment from a specific point or conveyance.
Riparian area: Wet soil areas directly influenced by the water of a stream, lake or wetland.
Runoff: Water that drains over the surface of the land.
Separate Sewer System: A sewage system in which storm water and sanitary waste are collected in different sewers.
Watershed: *All the land area that drains into a particular body of water*

GLWA
Great Lakes Water Authority

735 RANDOLPH STREET
DETROIT, MI 49226

GLWA

Great Lakes Water Authority

2019

SURFACE WATER INTAKE PROTECTION PROGRAMS

Public Education Activities Report

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Background

The Great Lakes Water Authority's (GLWA) Surface Water Intake Protection Programs (SWIPPs) for the Belle Isle, Lake Huron and Fighting Island intakes were approved by the Michigan Department of Environmental Quality (MDEQ) in early 2016. The SWIPPs build on the past source water assessment programs that have been in effect since 2004 and include additional protection efforts. Public education was identified as a key component of the SWIPPs because individual actions impact surface water quality and ultimately our sources of drinking water.

Recognizing the opportunities available within the GLWA's member outreach program to address SWIPP public education topics with member communities, the plans called for semi-annual discussion of SWIPP topics at Public Education Work Group meetings. The Public Education Work Group, together with GLWA's Public Affairs team, supported this effort during 2019 by developing SWIPP education messages, publishing an article and brochures, attending community events, co-leading a regional water quality education campaign and sharing social media posts. This report summarizes the efforts undertaken during 2019.

Activities undertaken and summarized in this report include:

- Discussions at four Public Education/Communication & Education Work Group meetings
- Publication of one article, one flier and two newsletters on the member outreach portal
- Extensive outreach as part of a regional water quality campaign
- Twenty-three social media posts through GLWA Facebook and Twitter

Discussions at Public Education Work Group Meetings

The Public Education Work Group met twice during 2019 and then merged with Communication and Water Quality work groups to form the Communication and Education Work Group, which met an additional two times in 2019. SWIPP discussions took place at all four meetings. Excerpts from the meeting summaries follow showing the development of outreach and education of the importance of protecting our source water via messaging in activities, articles, brochures, events, ceampaigns, and social media posts.

February 7, 2019 Meeting Discussion

1. Review SWIPP 2018 Activities Summary

The Great Lakes Water Authority's (GLWA) Surface Water Intake Protection Program (SWIPP) for the Belle Isle, Lake Huron and Fighting Island intakes are an MDEQ-approved six-year program. Public education is a key component of the SWIPP as individual actions impact surface water quality and ultimately our sources of drinking water. The plans called for educational outreach and semi-annual discussion of SWIPP topics at Public Education Work Group meetings.

The Public Education (now Communication and Education) Work Group supports by developing SWIPP education messages, writing articles and creating social media posts.

Work group participants reviewed the 2018 SWIPP education activities and suggested the following activities for 2019:

- Share previously created materials on source water protection with members with a specific call to action to share the material with their residents, posting on social media and including copies in libraries and municipal halls.

- Develop/revive messaging for St. Clair County residents and northern areas, to convey that their actions have an impact on water quality for others. Contact watershed groups and St. Clair County Health Department for distribution.

2. Wastewater Master Plan

Work group participants discussed GLWA's Wastewater Master Plan (WWMP), a regional forecast of the strategy for providing wastewater services to member communities for the next 40 years. The WWMP includes a water quality monitoring element which supports SWIPP objectives to protect source water.

Participants reviewed a draft WWMP newsletter, designed to convey the WWMP, its purpose and a high-level overview of the plan's development, highlighting major tasks and outcomes.

3. Regional One Water Campaign

Representatives from GLWA's Public Affairs group gave an update on the planned Regional Public Education Campaign on water. The campaign is being developed collaboratively by SEMCOG, GLWA, and Cranbrook's Freshwater Center.

An advisory committee of more than 25 water professionals throughout the region contributed to the strategic campaign plan. Committee members represented local, county, state and federal agencies; watershed groups; land conservancies; land grant and research universities; as well as other water or environmental organizations.

The advisory committee's focus in the first quarter of 2019 is to develop messaging for drinking water, wastewater, stormwater to support a 7-day blitz campaign during Water Week 2019. Campaign media will include radio, print, billboards.

4. Water Works Park Tour, GLWA's Water Treatment Plant

Water Works Park Tour is being updated with fresh environmental graphics and support materials. GLWA is hosting an employee family tour of the facility on May 11, 2019.

June 6, 2019 Meeting Discussion

1. SEMCOG Spotlight (Regional One Water Public Education Campaign)

Katie Grantham of SEMCOG presented an overview of the regional One Water Public Education Campaign, to increase awareness of the connected nature of our water, stormwater and wastewater systems and to educate the public on our shared responsibility for these resources. SEMCOG partnered

with GLWA and Cranbrook's Fresh Water Forum to develop the campaign objectives, messaging and materials.

The campaign period is June 1 – June 9, in coordination with Great Lakes and Fresh Water Week. Promotion includes print, radio and online advertising, as well as billboards and bus ads. SEMCOG shared campaign materials, such as tip cards and themed promotional giveaway items, with members.

The group plans to conduct a similar campaign in 2020, potentially with the Alliance of Rouge Communities joining as a supporter.

2. Water Educational Resources

Michelle Zdrodowski, GLWA Chief Public Affairs Officer, shared several GLWA water-related resources available for Member Partners to use for education and outreach at community events, including:

- Splash, a waterdrop mascot costume,
- Price is Right game illustrating the value of water, and
- Where Does it Go, a participatory game to demonstrate how to protect our wastewater system

3. MWEA Article, Back and Better than Before: The Huron-to-Erie Real-Time Drinking Water Protection Network

Lori Byron shared an article titled, *Back and Better than Before: The Huron-to-Erie Real-Time Drinking Water Protection Network*, published in MWEA Matters magazine's Winter 2019 issue. The article was the work of several members of the Public Education Work Group and supports the education requirements of the Surface Water Intake Protection Program (SWIPP).

August 15, 2019 Meeting Discussion

1. One Water Regional Education Campaign Concluded

The regional One Water Campaign, co-sponsored by GLWA and Cranbrook's Fresh Water Institute, ended recently. SEMCOG conducted an online survey to collect feedback to improve future campaigns and to understand citizen perspectives on water issues in Southeast Michigan.

November 5, 2019 Meeting Discussion

1. Work Group History Discussion

The Communications and Education Work Group marked its second convening with a review of the history of the three contributing work groups: Communications, Public Education and Water Quality.

- *Communications Work Group* was launched after a taste and order incident in the Downriver area, to provide a forum for GLWA and members to surface communications concerns and suggestions. The work group met quarterly.

- *Public Education Work Group* was launched in 1997 to increase customer communications at the wholesale level. After a hiatus of several years, it was relaunched in 2009 to combat negative press with information about water quality improvement efforts, the role of RTBs in reducing overflows, as well as **outreach to support the Surface Water Intake Protection Program (SWIPP).** The work group met six times a year, with periods of low attendance.

- *Water Quality Work Group* began in 2016, to address water quality topics and regulatory requirements, particularly proposed changes to the Lead and Copper Rule. Work group meetings were typically ad hoc, with a number of meetings conducted via web service.

Participants shared aspects they found most valuable about participating in the work groups, such as:

- Standardizing communications to create consistency across all member communities
- Unstructured idea sharing among members
- **Educational materials, designed for member partners to share with end users**

3. Public Affairs Content

Michelle Zdrodowski, GLWA's Chief Public Affairs Officer, gave a preview of several initiatives in development including standardized PowerPoint slides showing maps and statistics about the water and wastewater system.

Regional Campaign Overview, Outreach, Results

The 2019 Regional Campaign's extensive outreach and education components supported the public education goals of the SWIPP, particularly in emphasizing actions that citizens can take to protect drinking water in GLWA's service region and in the areas of upstream of the Lake Huron intake.

Following is an overview of the campaign, its contributors and results.

Campaign Overview

In June 2019, SEMCOG, GLWA and the Freshwater Forum of the Cranbrook Institute of Sciences launched One Water, a comprehensive, regional public education campaign to raise awareness and generate appreciation for water resources and infrastructure topics including drinking water, wastewater, stormwater and the connection of these to the blue economy, recreation, quality of life and economic prosperity in Southeast Michigan.

The specific goals of the *One Water* public education campaign, which align closely with the outreach goals of the SWIPP, were to:

- Raise greater awareness, understanding, and shared responsibility for water resources,
- Encourage citizens to adopt best practices at the household level, and
- Build support for drinking water, stormwater, and wastewater systems.

Campaign materials included video ads, tip cards, radio ads, social media graphics, giveaway items, billboards, and bus ads.

According to SEMCOG's post-campaign survey, *One Water* gained recognition and recall among more than 1.3 million people throughout the region. The campaign increased awareness among residents of the importance of stormwater and wastewater systems relative to drinking water.

The three partnering organizations recruited an advisory group made of approximately 30 water professionals from communities and non-profit agencies throughout the region, to assist in developing a strategic communication plan. The advisory committee represented a variety of organizations:

- local, county, state, and federal agencies,
- watershed groups,
- land conservancies,
- land grant and research universities, and
- other water/environmental NGOs.

Campaign work groups developed key messages for drinking water, wastewater and stormwater. Participating groups include Friends of the Rouge, Clinton River Watershed Council, Huron River Watershed, Erb Family Foundation, City of Ann Arbor, Washtenaw County, St. Clair County, Oakland County, and Macomb County. Other participants included representatives from engineering consulting firms and advocacy groups. The campaign was structured as a blitz effort to saturate media outlets over a 10-day period, around Water Week, the first week of June.

Media products included:

- Campaign logo
- Tip cards
- Social media graphics
- Bus posters
- Billboards
- Radio advertisements
- Videos
- Giveaway items (pet waste collection bags, grease collection bags, collapsible water bottles)
- Website

Campaign Results

According to SEMCOG, the *One Water* campaign reached more than 25 million impressions during the spring and summer of 2019. This included:

- 14 million impressions via outdoor advertising on billboards and buses,
- 1.3 million impressions on 120 broadcast TV spots,
- More than 3 million impressions on social media,
- 491,000 video views on social media,
- More than 2,300 shares and retweets, and
- 3 million impressions on 115 radio spots.

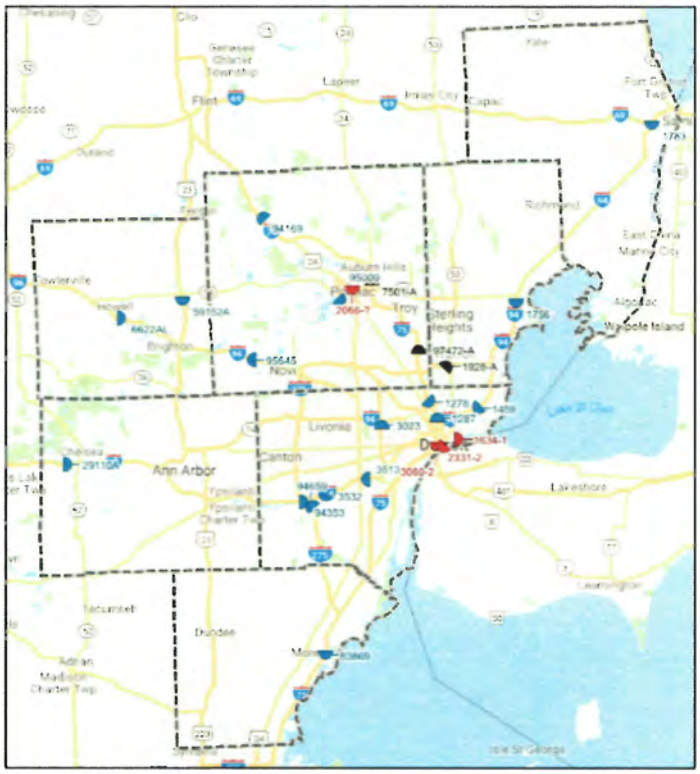

Figure 1 Billboard locations

Video public service announcements were broadcast on 66 community TV stations. Cranbrook, GLWA, and SEMCOG posted to social media daily throughout the campaign, garnering the engagement cited above, and messages were posted by dozens of partners and individuals.

Materials Distribution

Nearly 44,000 campaign items were distributed throughout the region. The map below shows locations of partners who distributed materials.

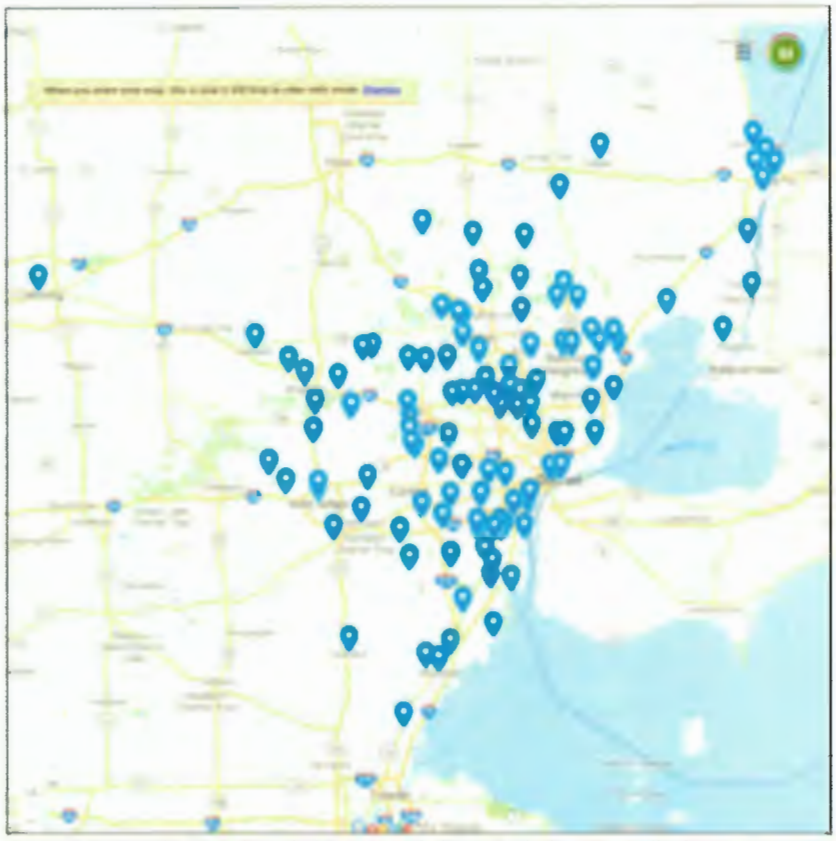

Figure 2 Materials were shared at a range of places, including city halls, farmers markets, and special events

Publication of Articles on the Member Outreach Portal

The Public Education Work Group publishes articles on topics of interest to member communities about how GLWA and its member communities manage our water and sewer infrastructure to protect public health and the environment. Articles are published under the *Operation Clean Water* masthead, and emailed to member communities, environmental groups and the media. They are also posted on the outreach portal at outreach.glwater.org. Some articles are sent to MWEA and AWWA Michigan for inclusion in their publications.

One article related SWIPP topics was published in 2019:

- *Back and Better than Before: The Huron-to-Erie Real-Time Drinking Water Protection Network.* Posted to the portal and published in MWEA Matters magazine, this 3-page article describes the threats to the drinking water intakes and how the Huron-to-Erie monitoring network will protect drinking water from potential contaminants through its real-time monitoring equipment. The SWIPPs are referenced.

This article is included in Attachment A.

Educational Newsletters, Brochures and Posters Distributed through the Member Outreach Portal

To support clean water initiatives and education, the Public Education/Communications & Education work group publishes newsletters, brochures and posters for members to use in their communities. The materials published in 2019 include:

- Wastewater Master Plan newsletter Q1 2019
- Wastewater Master Plan newsletter Q4 2019
- Flushables poster and leaflet

The newsletters, brochure and poster are included in Attachment B.

Social Media Posts Through GLWA Facebook and Twitter

The Public Affairs team published social media posts on water and wastewater topics. Twenty-three posts on SWIPP topics tied to the regional campaign, relevant celebrated days and holidays as well as topics featured in the educational fliers were created.

All posts are shown in Attachment C.

ATTACHMENT A - ARTICLE RELATED TO SWIPP TOPICS

GLWA
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Back and Better than Before:

The Huron-to-Erie Real-time Drinking Water Protection Network

"Monitoring first, notifications second," Bari Wrubel states emphatically. As Water Utility Superintendent for the City of Marysville, Wrubel is a leading advocate of the Huron to Erie Monitoring Network, a real-time drinking water monitoring network that protects the public from environmental and man-made contaminants. ■■■■■

Built in 2006, the system is made of a series of water monitoring devices at plants from Port Huron to Monroe, mostly along Lake St. Clair and the Detroit River.

In September 2018, the 14 drinking water plants along the corridor received new monitoring equipment and software to take minute-by-minute readings, looking for changes in the water. This gives operators advance notice of potential problems.

"Reaction time is important," said Wrubel, explaining the need for frequent monitoring and cooperation among drinking water plant operators. "If freighters have a spill, especially on the Canadian side, the notices take a long time, sometimes a couple hours. We don't have a couple of hours. That's why it's monitoring first, notifications second."

The drinking water plants along the 80-mile stretch are Port Huron, Marysville, St. Clair, East China Township, Marine City, Algonac, Ira Township, New Baltimore, Mount Clemens, Grosse Pointe Farms-Highland Park, GLWA-Water Works Park, GLWA-Southwest, Wyandotte, and Monroe. Additionally, network participants formed a public-private partnership with DTE Energy to increase notification and response time along the corridor.

Grant Reactivates Network ■

The network, intended to provide early warning of chemical spills or contamination that could impact the source of drinking water, fell into disuse after five years. It's recently been reactivated, thanks to a $375,000 grant from the Michigan Office of the Great Lakes.

The Southeast Michigan Council of Governments (SEMCOG) will administer the funding, distribute equipment, and provide training to plant operators.

Kelly Karll, SEMCOG engineer, points out that the primary responsibility of all drinking water providers is to protect public health, and catalogs the potential threats looming along the Huron to Erie corridor. "It's a global shipping route, with heavy manufacturing in our own region. 40% of Canada's chemical companies are located there, along with 10 oil and natural pipelines that cross the rivers. There are risks with each of these, and the fast flow of the river makes the timing for spill response challenging."

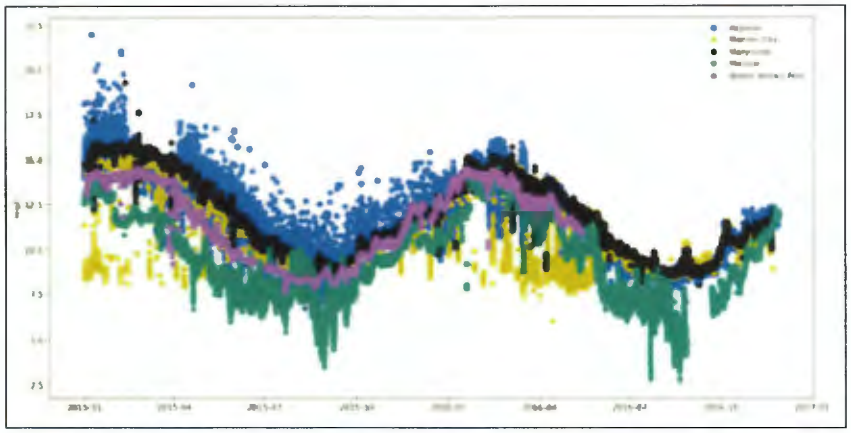
The risks aren't just theoretical. A report by engineering consulting firm Environmental Consulting & Technology (ECT) says that there were more than 700 chemical spills between 1986 and 2012, most unreported.

Protecting drinking water is the first of five key priorities in our state's comprehensive, ecosystem-based water resource strategy. The Office of the Great

Installed multi-parameter Sonde probe monitors and reports changes in water quality parameters.

ECT consultant Meghan Price holds a monitoring probe in a still from a training video. ECT will provide initial training and ongoing calibration of the monitoring equipment.

Lakes' Michigan Water Strategy report, published in October 2016, emphasizes the importance of monitoring water sources:



Dissolved Oxygen Measurements (Wayne State University Data Platform).

The ability to achieve Michigan's vision for its water resources depends on a strategic, collaborative ecosystem-based plan that monitors the health and condition of our water resources, invests in water-related infrastructure, uses water more thoughtfully and efficiently to grow sustainable economies, reconnects communities to water and fosters a water ethic and culture of stewardship.

Simple Equipment, Real Time Readings ■

The initial Huron-to-Erie Monitoring Network was a moderate success, but over time, fell into disuse until only a handful of the original participating plants remained. A victim of overly ambitious technology implementation, the early network used equipment that was complex, costly to repair and plagued with ongoing calibration issues. When the grant that funded the original equipment ran out, local budget challenges in many communities limited ongoing equipment inspection, maintenance, and calibration.

Mary Lynn Semegen is the Water Quality Manager for The Great Lakes Water Authority (GLWA), the regional utility which provides drinking water to approximately 40% of the residents in the state of Michigan. Two of the network's 14 drinking water treatment plants are operated by GLWA. Semegen describes the challenges, "The equipment was so sophisticated that plants needed a dedicated person just to maintain it, which isn't workable. Operators have to run the plant."

SEMCOG, which spearheaded the effort to revive the network, made simple equipment a priority in the new iteration. Each plant received a new multi-parameter Sonde, an instrument probe that automatically sends information to computers in the plant. The probe monitors and reports changes in pH, conductivity, temperature, dissolved oxygen, turbidity, and blue-green algae.

The DTE power plant in St. Clair County, located upstream from the East China Township drinking water treatment plant, also received equipment, which was installed at the power plant cooling water intakes. This partnership enhances the network's spill response monitoring activities.

"All the participating utilities can go online to look at each other's data. And there's a model that uses data from the National Oceanic and Atmospheric Administration (NOAA) to visually show how fast a spill is moving," said Semegen.

More Than What's Required ■

Karll and Semegen are quick to point out the plants have continuously monitored their intakes and rigorously tested the water to meet water quality standards, even though some stopped participating in the network. The revived network brings more frequent readings, which allows for more time to react, as well as increased information sharing among the plants and even the general public.

SEMCOG has been involved in the monitoring network since its inception, but will take a more active role in the new iteration, including facilitating quarterly meetings of the participants and working with the Michigan Office of the Great Lakes to seek funding for the long-term sustainability of the program. Participants committed to maintain their equipment and participate in the network for a minimum of five years.

SEMCOG's Karll is optimistic, thanks in part to increased public concern about water quality. "One of our roles is to pull in the Michigan Department of Environmental Quality (MDEQ) and emergency response personnel to ensure a cohesive operation. We're getting strong support from all the stakeholders. Counties and health departments are also participating in the meetings."

Researchers Use Data to Look at Changes in Water Quality ■

Carol Miller is a professor of environmental engineering at Wayne State University (WSU). She's also the Director of WSU's Healthy Urban Waters initiative, "a collaboration of Wayne State University researchers networked with the community to focus on water in an urban setting and future impacts of human culture on community, ecosystem, and economic health."

Miller has been involved in developing a user platform website to download and perform statistical analysis on the data collected by the monitoring network. Below is an example of the type of data that can be retrieved from the platform, showing dissolved oxygen (DO) measurements.

"After the data undergoes quality control, it's made available to the public," Miller explains. "Researchers in the Great Lakes region and beyond use the data to look at changes in water quality over time. They can relate those changes to things that are going on in the corridor and around the ground."

WSU has a group of researchers who've used the Huron to Erie platform, along with climatological data, such as rainfall, temperature, and wind speed to develop a predictive model to predict water quality in response to factors like rainfall.

Beach closures are another application. "Researchers are using it to better understand the quality of drinking water and the contamination of urban beaches. We think that collecting this data will help give us a good picture of what happening when beaches need to be closed for E. coli."

GLWA's Balvinder Sehgal talks to a group at the Water Works Park Pilot Plant, where Wayne State University and GLWA collaborate on research to enhance the drinking water monitoring system along the Huron to Erie Corridor.

Wayne State University used funding from the Erb Family Foundation to help create the interface for the public and researchers.

Through the Healthy Urban Waters initiative, the University aims to make the data available for concerned citizens, to show water quality and changes over time. Miller notes that the data can be used in science, environmental engineering, even data management. "There are a lot of potential uses that haven't been tapped yet."

Committed for the Long Term ■

Marysville was one of a handful of water treatment plants that continued to use the monitoring equipment, even after the original grant expired and other participants dropped off. Water Utility Superintendent Wrubel and his team learned to calibrate the equipment themselves, and switched to self-hosted software to cut costs. He's determined to keep the monitoring system operating.

"To me, it's invaluable. Upstream of us are pipelines, and those pose a risk, but it's also a great day-to-day operational tool. I'll never let the system go. It's worth its weight in gold."

ATTACHMENT B - NEWSLETTERS, BROCHURES AND POSTERS

GLWA
Great Lakes Water Authority

GLWA

FIRST QUARTER 2019

WASTEWATER MASTER PLAN

Wastewater Master Plan is Great Lakes Water Authority's strategy for providing wastewater services to its member communities and ultimately, residents and businesses in the region. The plan ensures that the wastewater system meets current and future needs and is able to provide cost-efficient, regulatory-compliant and reliable services to the GLWA communities for the next 40 years.

REGIONAL FORECAST

- 40 Year Planning Document
- Plan Development Timeline 2017 - 2019

REGIONAL SYSTEM MODEL

Update and combine 15+ municipal computer models into one comprehensive model to see how the system works as a whole.

One model to rule them all

3x MORE DETAIL

SERVICE AREA

900+ square miles

Combined Sewers ☐ Separated Sewers ☐

REGIONAL OPERATIONS PLAN

Operators working together to manage flows.

- Maximize flow to the WRRF
- Minimize untreated discharges to the rivers

5 OUTCOMES OF THE WWMP

Developing the WWMP includes evaluating many potential projects. The 5 Desired Outcomes serve as filters in determining which projects will be included in the plan.

250 Actions

1. Protect public health and safety
2. Preserve natural resources and a healthy environment
3. Maintain reliable, high-quality service
4. Assure value of investment
5. Contribute to economic prosperity

> "Our collective goal is to have clean lakes, rivers and streams and that means that we cannot continue on the path of discharges. The Wastewater Master Plan will create a common understanding of how the system operates and what further improvements Macomb can make to help the entire system. Communities across the region will be able to plan future projects that improve the overall system."

Candice Miller
Macomb County
Public Works Commissioner

ONE WATER ONE TEAM

Outreach@glwater.org

SAVE OUR SEWER SYSTEM FROM "FLUSHABLE" WIPES

"Flushable" wipes are a growing hazard to public health, causing sewer backups and overflows. These so-called "flushable" wipes are not biodegradable!

THEY CLOG OUR PIPES

Don't flush wipes or other items that can clog pipes in your home, the sewer system, pump stations and equipment at the Water Resources Recovery Facility (WRRF).

Clogged pipes can lead to overflowing toilets and basement sewer backups. When this happens, you'll need to call a plumber to clear the blockage.

NEVER FLUSH

- Baby wipes or cleaning wipes
- Tampons and sanitary products
- Condoms
- Tissues
- Paper towels
- Dental floss
- Cotton balls and swabs
- Cat litter
- Prescription drugs
- Over-the-counter medicines
- Cigarette butts

GLWA Great Lakes Water Authority

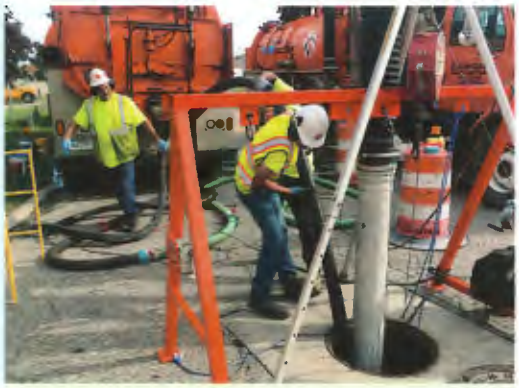
Member Outreach

STICK TO THE 3 Ps

Only three things go in your toilet: pee, poo and (toilet) paper! If you really want to use wipes, throw them in the garbage, not your toilet.

A COSTLY MAINTENANCE MESS

"Flushable" wipes wreak havoc in sewer systems across the region. In 2018, workers in Macomb County removed a 19-ton, 100-foot fatberg, a deposit of fat and grease, mixed with wipes. The process cost about $100,000.



Used "flushable" wipes and other items removed from a sewer in Clinton Township by the Macomb County Public Works Office.

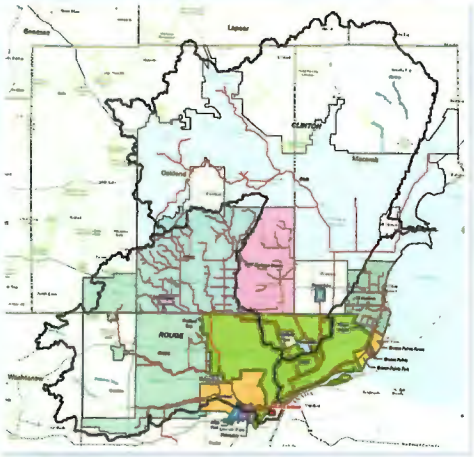
GLWA
Great Lakes Water Authority

FOURTH QUARTER 2019

WASTEWATER MASTER PLAN

The Wastewater Master Plan is the Great Lakes Water Authority's strategy for providing wastewater services to its member communities and ultimately, residents and businesses in southeast Michigan. The plan ensures that the wastewater system meets current and future needs and is able to provide cost-efficient, regulatory-compliant and reliable services to GLWA member partners for the next 40 years.

GLWA and its member partners will begin implementing the Wastewater Master Plan in early 2020.



REGIONAL FORECAST

40 YEAR PLANNING DOCUMENT 2020 – 2060

PHASE 1 Optimize Existing Infrastructure

Cost-effective solutions to meet water quality priorities

- Reduce public health risks by maximizing the amount of wastewater flow captured in the collection system, especially during frequent, small storms
- Achieve Michigan Water Quality Standards for recreation and aquatic species protection in dry weather

PHASE 2 Adapt and Expand Facilities

Further investment to extend water quality benefits

- Expand public health protections with added storage, sewer separation, and further maximize wastewater flow to the Water Resource Recovery Facility (WRRF)
- Achieve Michigan Water Quality Standards for recreation in dry weather and aquatic species protection in wet weather

PHASE 3 Sustain System Performance

Sustainably meet wet weather regulatory requirements

- Implement emerging technologies and infrastructure maintenance programs to cost effectively meet regulatory requirements
- Invest in new treatment processes and instrumentation to maximize the use of existing facilities with real time control

5 OUTCOMES OF THE WWMP

1. Protect public health and safety
2. Preserve natural resources and a healthy environment
3. Maintain reliable, high-quality service
4. Assure value of investment
5. Contribute to economic prosperity

ONE WATER ONE TEAM

Outreach@glwater.org

SAVE OUR SEWER SYSTEM FROM "FLUSHABLE" WIPES

THEY CLOG OUR PIPES

NEVER FLUSH

- Baby wipes or cleaning wipes
- Tampons and sanitary products
- Condoms
- Tissues
- Paper towels
- Dental floss
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- Cat litter
- Prescription drugs
- Over-the-counter medicines
- Cigarette butts

SAVE OUR SEWER SYSTEM FROM "FLUSHABLE" WIPES

THEY CLOG OUR PIPES

"Flushable" wipes are a growing hazard to public health, causing sewer backups and overflows.
"Flushable" does not mean biodegradable!

STICK TO THE 3 Ps

Only three things go in your toilet: pee, poo and (toilet) paper! (If you really want to use wipes, throw them in the trash!)

GLWA
Great Lakes Water Authority

Member Outreach

ATTACHMENT C - SOCIAL MEDIA POSTS

GLWA
Great Lakes Water Authority

2019 SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS

Earth Day: Protect our Water

Great Lakes Water Authority
April 22, 2019 ·

Together, when we take good care of our water sources, we take good care of our planet, as well. This Earth Day, let's reaffirm our collective responsibility to protecting our planet by protecting our water.

5 4 Shares

Prescription Drug Take Back Day

Great Lakes Water Authority
April 26, 2019 ·

Tomorrow is National Prescription Drug Take Back Day. Watch this short video by the Michigan Department of Environmental Quality to learn how to safely get rid of unused medications. You can also visit this website to find a drug take back location near you: http://bit.ly/2IHv19S

YOUTUBE.COM
MI EnviroMINUTE - Drug Disposal
Closed captioning is now available in English, Spanish, and Arabic! Got ...

3

Source Water Education for Drinking Water Week

Great Lakes Water Authority
May 7, 2019 ·

This Drinking Water Week is the perfect opportunity for a fun family activity with your kids to learn about water.

7 2 Shares

One Water Campaign: Fresh Water Week

Great Lakes Water Authority
May 30, 2019 ·

SEMCOG, Southeast Michigan Council of Governments
May 30, 2019 · Like Page

SEMCOG NEWS: One Water partnership begins with Great Lakes and Fresh Water Week. More info here http://bit.ly/2I8IbMx

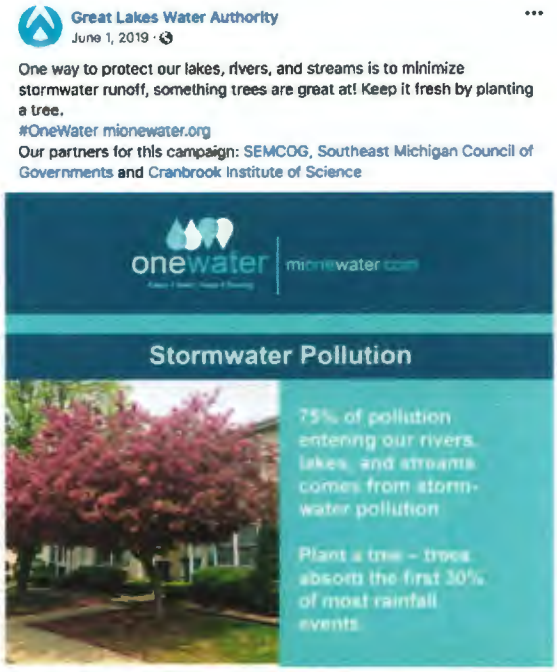
SMCG.INFORMZ.NET
One Water Partnership Begins with Water Week
Contact:Michele Arquette-Palermo, Freshwater Forum at Cranbrook...

9

2019 SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

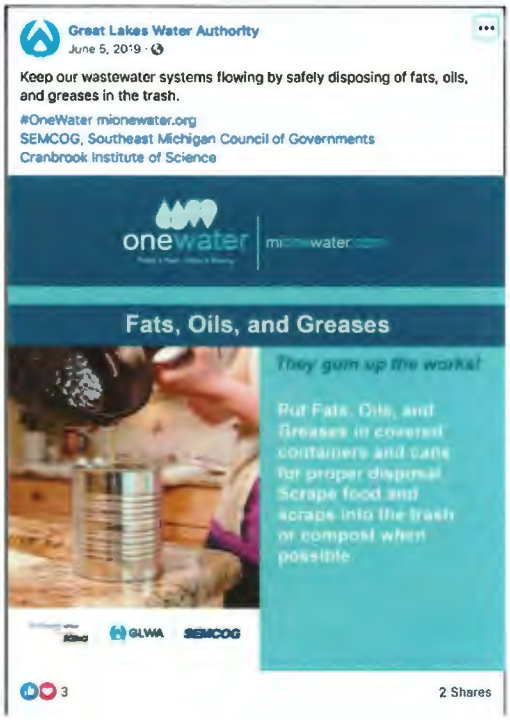
Protect Source Water: Stormwater Pollution



One Water Campaign: Fresh Water Week

Protect Source Water: Pet Waste

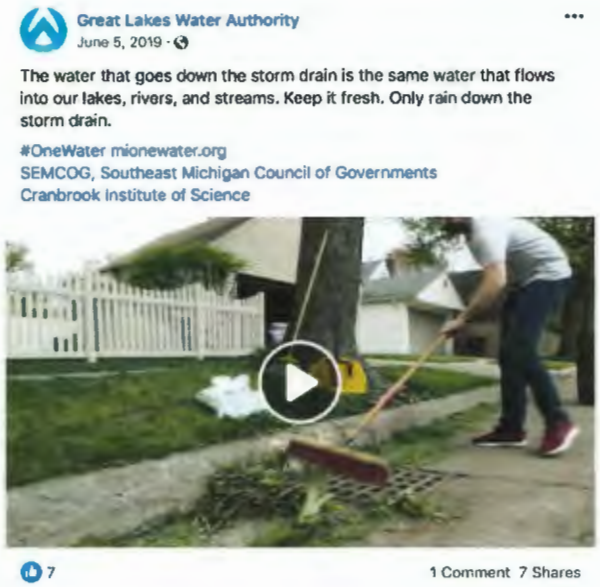
One Water Campaign: F.O.G.



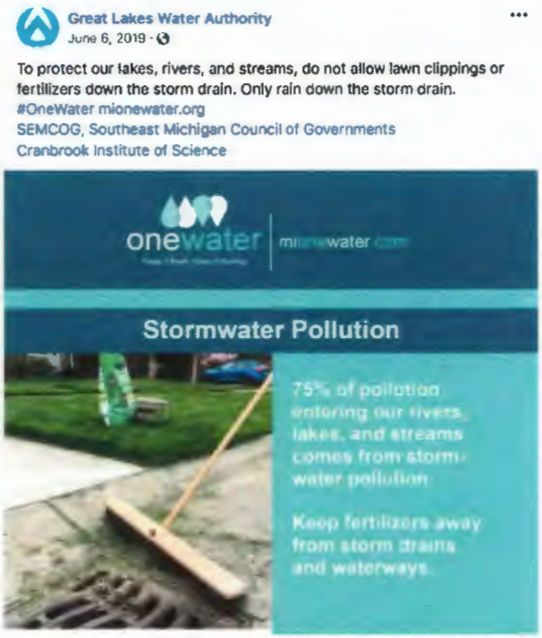
2019 SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

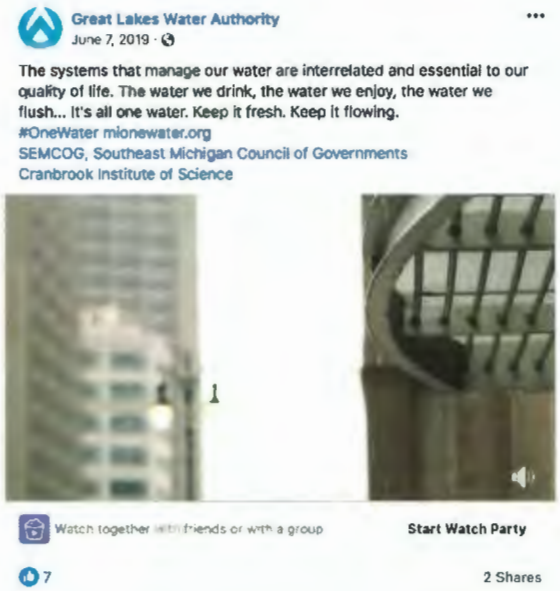
One Water: Connected Systems



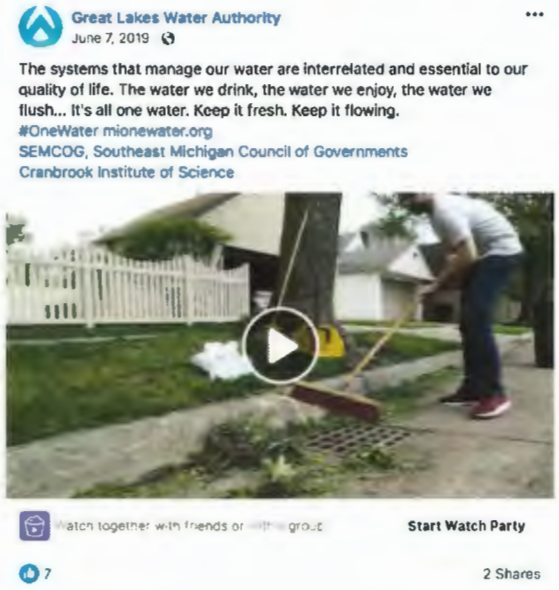
One Water Campaign: Lawn Care



One Water Campaign: One Water



One Water Campaign: One Water



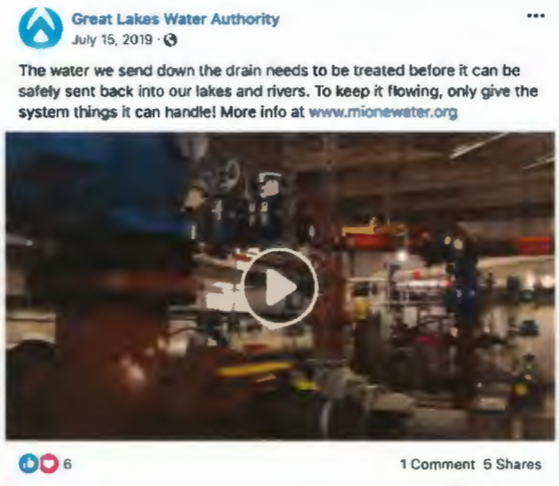
2019 SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

One Water: Stormwater Pollution

One Water Campaign: Lawn Care

One Water Campaign: Wastewater to Source Water



Water Quality Month

2019 SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

Drinking Water Quality

Great Lakes Water Authority
August 16, 2019 ·

As the primary provider of water and sewer services to Southeast Michigan, the GLWA team works 24/7 to ensure your drinking water not only meets regulatory standards, but surpasses them. Visit www.glwater.org for more information.

8 4 Shares

Water Quality Month: Sampling

Great Lakes Water Authority
August 19, 2019 ·

This Water Quality Month we'd like to thank all of our team members who go out daily to collect water samples in southeast Michigan to make sure your water quality is of the highest standards.

6 5 Shares

One Water: Storm to Source

Great Lakes Water Authority
August 26, 2019 ·

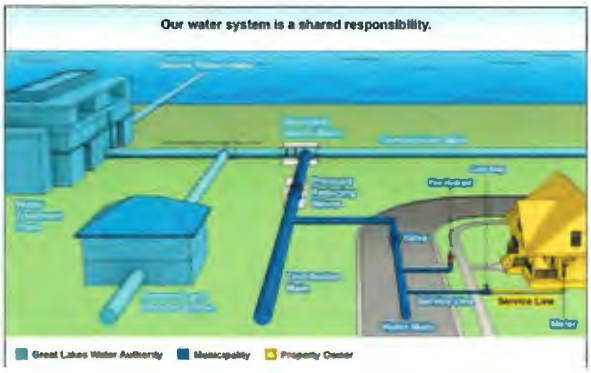
The water that goes down the storm drain is the same water that flows into our lakes, rivers, and streams. Keep it fresh. Only rain down the storm drain. Also, take this survey for a chance to win a $75 gift card: http://bit.ly/2KT31Rr

8 1 Comment 7 Shares

Drinking Water: Shared Responsibility

Great Lakes Water Authority
August 28, 2019 ·

Our drinking water is a shared responsibility. From the environment to your tap and back, we all must do our part to make sure our region continues to get water of the highest standards.



9 1 Comment 5 Shares

2019 SWIPP ACTIVITIES REPORT

SOCIAL MEDIA POSTS, CONTINUED

Protect Groundwater Day

Everyday Actions: Protect Sourcewater

Prescription Drug Take Back Day

SURFACE WATER INTAKE PROTECTION PROGRAM (SWIPP)

OPPORTUNITIES FOR EXPANDING SWIPP OUTREACH UPSTREAM OF THE LAKE HURON INTAKE

MAY 2, 2018

PREPARED BY:
GLWA MEMBER OUTREACH
PUBLIC EDUCATION WORK GROUP

GLWA
Great Lakes Water Authority

Opportunities for Expanding SWIPP Outreach Upstream of the Lake Huron Intake

As part of their feedback on the Lake Huron Surface Water Intake Protection Program (SWIPP), the Michigan Department of Environmental Quality (MDEQ) asked the Great Lakes Water Authority (GLWA) to look at opportunities for public education in areas upstream of the intake. To better understand water quality educational activities already underway, interviews were conducted with agencies in St. Clair, Sanilac and Huron Counties to learn what they were doing and identify opportunities to share educational materials or collaborate on messaging.

The following agencies were interviewed:

- St. Clair County Health Department
- St. Clair County Drain Commissioner
- Blue Water Conservation District
- Huron County Drain Commissioner
- Huron Conservation District
- Huron County Health Department
- Sanilac County Drain Commissioner

A summary of the telephone interviews begins on page 3.

The interviews revealed that soil conservation districts have strong, hands-on programs focused on promoting agricultural best management practices (BMPs) to protect area surface water quality. Health departments provide educational materials on septic tank maintenance. The St. Clair County Health Department even goes one step further and provides stormwater education for the County's stormwater permit.

The majority of water quality messaging throughout the upstream area focuses on the impacts of agricultural land use. This differs from messaging used in GLWA's urbanized service area with dense development and different runoff concerns. As a result, the practicality of repackaging GLWA's existing materials for use in upstream areas is limited. However, there are opportunities to promote messaging related to source water protection for local drinking water supplies as well as the 4 million people downstream served by GLWA. This would support a greater awareness that actions to protect water quality throughout the region impact drinking water supplies in the immediate area and downstream.

Each county has their own methods of communicating with residents so a one-size-fits-all approach to supplementing water quality messaging within the counties will not work. A phased approach that evaluates the effectiveness of activities would be more appropriate. A three-phase approach that could be incorporated into future GLWA outreach efforts is described below. Phases 1 and 2 could be implemented at the same time.

Phase 1 - Integrate upstream outreach with broader messaging campaigns under development

- Ask the regional water campaign being developed by Cranbrook, SEMCOG and GLWA to support messaging that our actions impact source water used for nearby and downstream drinking water supplies. This campaign's reach will extend beyond the GLWA service area.
- GLWA could reach out to the above upstream agencies to share campaign materials once they are developed.

- Evaluate applicability of messaging and how well it is embraced by upstream area.

Phase 2 - Use social media with upstream agencies that are using it to simply and inexpensively reinforce applicable water quality messaging

- GLWA start following the above agencies on Facebook to monitor for water quality related posts. If applicable, like a post. For example, if a soil conservation district promoted the use of an agricultural BMP, GLWA could like it and comment: *Great agriculture practices protect water quality in the immediate area and downstream. Thank you for implementing BMPs that help protect source water GLWA treats to provide drinking water to 4 million residents.*
- GLWA share water quality related videos with agencies that their audiences would be interested in.
- Public Education Work Group consider creating Facebooks posts that the agencies and stormwater communities in St. Clair County could use with messaging about downstream impacts on water quality and how much of the state's population depends on surface water for drinking water.
- Evaluate frequency of opportunities and effectiveness.

Phase 3 - Repurpose content for urban upstream communities and create new content.

- GLWA consider participating in an Earth Day event or other water quality events in the upstream area to reinforce that downstream water is being used as the source water for 103 communities in Michigan and that activities upstream matter.
- Public Education Work Group shorten and simplify *Everyday Actions that Matter!* article into a community newsletter format that can be used by St. Clair County shoreline communities that must publish stormwater articles. Include reference to downstream use of source water to providing drinking water to 4 million Michigan residents.
- Public Education Work Group reach out to newspapers in more urbanized areas in St. Clair County along the shoreline to see if they would be interested in developing an article in conjunction with a local agency or community and GLWA that focuses on local water quality issues. GLWA officials could be quoted about downstream use of source water.
- GLWA encourage and actively promote above activities on Facebook.
- Evaluate effectiveness of activities.

Interviews Summary

ST. CLAIR COUNTY HEALTH DEPARTMENT

Sheri Faust, Environmental Health Educator
Website: http://www.stclaircounty.org/offices/health/storm_water.aspx
Facebook: https://www.facebook.com/scchdmi/
Twitter: https://twitter.com/scchdmi

Educational Activities Undertaken/Information Learned

- St. Clair County must comply with stormwater regulations. Sanilac and Huron Counties do not have regulatory requirements since they do not have large urbanized areas. Lexington is the only large community in Sanilac County.
- Non-point runoff in Sanilac County is tied to agricultural runoff and outreach is geared toward best management practices (BMPs) addressing this. Most outreach has been funded by grants.
- Conservation Districts do not have a strong online presence. They could benefit from brochures and articles that they can place in their offices for foot traffic. Past surveys on how people get information ranked word of mouth, newspapers and conservation districts as the highest.
- St. Clair Health Dept. works with the Conservation District on an Earth Day Fair event each year. It is held in conjunction with the District's spring tree sales on the last weekend (Friday/Saturday) in April. This is a good outreach event. About 70 vendors buy booth spaces. Drinking water is a topic covered at the event.
- The Canadian side of the St. Clair River is highly industrialized. The Health Dept.'s outreach activities are tied to the Area of Concern (AOC). The St. Clair River has drinking water impairment and fish consumption advisories.
- St. Clair River AOC Binational Public Advisory Council (BPAC) meets every other month and switches meeting locations between countries. They have guest speakers at their meetings. PAC supports same messaging as us. They are working to restore the area and need to talk about protection.
- St. Clair Health Dept. has septic maintenance information on their website. Sanilac and Huron County Health Depts. handle septic tank education and maintenance.
- Drain Commissioners would be good to reach out to and learn what they are doing.
- St. Clair County Health Dept. is the only health dept. in the state that handles the NPDES storm water permit for the county.
- Most of the population in St. Clair County lives within 3 miles of the shoreline. These people are on municipal water. The rest of the population is on wells.
- St. Clair Health Dept. has a stormwater group for the watershed that meets every other month. It includes 13 municipalities and 7 school districts. These are all shoreline communities. These communities need to publish an article related to stormwater each season for permit compliance. They like tips and places to get more information.
- Beach monitoring is the most active and visible water quality program in St. Clair County. Can tie in with message here that what you are doing impacts surface water.

Advice/Suggestions for Reaching Local Audience

- Forty-three Areas of Concern (AOC) were identified by the International Joint Commission. The MDEQ Office of the Great Lakes contact for AOC would be a good person to talk to about areas that are included in upstream areas of intake.
- It would be good to follow up and see if any of the Area of Concern PACs are participating in GLWA's Wastewater Master Plan.

- Sanilac County does beach monitoring in the summer. Consider reaching out to them. Their messaging is about healthy swimming water.
- Consider reaching out to St. Clair Health Dept.'s stormwater group and providing information they could use in newsletters.
- Newspapers in the area have been very supportive of outreach messaging.
- MSU Extension is a good resource to conduct workshops on septic tanks.
- #1 thing St. Clair Health Dept. gets asked is "What can I do?". Need to be as specific and direct as possible in responses - and in the thumb of Michigan this relates to agriculture fields, clay soils, runoff, open drains and ditches, streams and creeks, Lake Huron, and the St. Clair River. Messaging is different in this area compared to GLWA urbanized service area – more concerned about nutrient inputs, medicine and pharma in water.

ST. CLAIR COUNTY DRAIN COMMISSIONER

Jim Hartson, Engineering/Deputy Drain Commissioner
Website: https://www.stclaircounty.org/offices/drain_commission/Default.aspx
Facebook: none
Twitter: none

Educational Activities Undertaken/Information Learned

- Drain Commissioner's office does not currently have the time to undertake education activities. Have worked with the County on the Northeast Watershed MS4 permit. Gave a presentation at a middle school some time ago.
- Most of the calls they receive are people concerned with water movement. Some calls are related to water quality – sediment or other pollution.
- Have some educational materials in the office but don't get a lot of foot traffic so don't think it is effective.
- Have a static website and do not update the materials so probably wouldn't link to materials or videos on other websites. They have links to permit information on their website.
- Morning show on radio station features different people, like Township Supervisor or Port Huron Council person after a meeting. AM 1380 WPHM http://www.wphm.net/
- Can be challenging to get farmers to use buffer strips. No one disagrees that it makes sense to have them but it costs money to create them.
- Don't use social media.

Advice/Suggestions for Reaching Local Audience

- Look into opportunities with online-streaming news on Everything Blue Water TV (EBWTV). http://ebw.tv/

BLUE WATER CONSERVATION DISTRICT

Joe Kautz, District Manager
Website: https://www.bluewatercd.org/
Facebook: https://www.facebook.com/BlueWaterCD/
Twitter: none

Educational Activities Undertaken/Information Learned

- District covers St. Clair and Sanilac Counties.
- District undertakes water and land protection education as part of Michigan Agriculture Environmental Assurance Program (MAEAP). This is an innovative, proactive program that helps farms of all sizes and commodities voluntarily prevent or minimize agricultural pollution risks.
- District uses MAEAP grants from state to fund two technicians (environmental and water quality) that implement the program. Work with about 100 farmers in each county a year. Technicians work with farmers to design containment areas, filter strips, and assist with nutrient management. Follow NRSF and USDA standards.
- MAEAP participation provides additional benefits to farmers through liability protection. If a farmer is MAEAP verified and they experience problems after spraying a field due to temperature changes or the spray moves to a neighbor's field, they may not be liable, and insurance will pay damages. If they have a fertilizer spill when the proper infrastructure is in place, there may be no punitive damages from MDEQ. Insurance companies also offer a discount for participation.
- No-till Drill Program that addresses water quality and soil erosion. Direct feeding into soil. Rent drills to farmers.
- Conservation District holds 5 to 7 meetings per year. They have gotten away from radio shows due to the time required. Younger crowd is more internet-based.
- Have a tree planting program. Go to school and give away seedlings.
- Working with Macomb County on urban reforestation scenario where they are trying to retain more water on the land.
- Do not work with septic systems.
- Website is currently under development. Have a Facebook page. Link to other videos if of interest to their constituents – interested in conservation.

Advice/Suggestions for Reaching Local Audience

- Look at going beyond Facebook to other social media tools.
- Will link to videos or materials if feel will be of interest to their audience.

HURON COUNTY DRAIN COMMISSIONER

Kristie Koroleski, Drain Clerk
Website: http://www.hcroads.com/
Facebook: none
Twitter: none

Educational Activities Undertaken/Information Learned

- Do not undertake any outreach. Were not part of 319 grants. Pretty much just get requests for drain cleanouts.
- Office might use materials if given to them.
- Do not have their own website – are part of road commission. Do not use social media.

- Local radio station (WLEW) has Wednesday morning roundtable that is 30 to 40 minutes long. thumb.net/wlewamfm.php

HURON COUNTY SOIL CONSERVATION DISTRICT

Jeanette Renn, District Manager
Website: http://huroncd.org/
Facebook: https://www.facebook.com/Huron-Conservation-District-206023082832169/
Twitter: none

Educational Activities Undertaken/Information Learned

- Have a 319 grant through MDEQ to install BMPs to control bacteria and nutrients from agricultural sources in the Bad Axe Creek watershed (Pinnebog River).
- Part of the 319 grant is used by the Health Department to enter septic permits into a database so the information is readily available.
- Huron County Health Dept. runs ads in the newspaper occasionally about proper maintenance.
- Money is still available in the 319 Program however it is for implementation not planning.
- Outreach consists of one-on-one with farmers to implement BMPs.
- Participate in MAEAP. Have one technician.
- Their website is more current than their FB page. Just post to FB when have something timely.

HURON COUNTY HEALTH DEPARTMENT

Andrea, Environmental Health Secretary
Tip MacGuire, RS Environmental Health Director
Website: https://www.hchd.us/
Facebook: https://www.facebook.com/Huron-County-Health-Department-1048441651886045/
Twitter: none

Educational Activities Undertaken/Information Learned

- When new septic tank is installed or replaced, the homeowner receives a brochure on how to use and maintain it as well as drawings of its location.
- Focus of website and FB is primarily health related.
- Using 319 grant money to run septic tank maintenance advertisements in local papers a couple of times a year. Ad is ¾ page in size and covers maintenance and what you can/cannot put into septic tank. Septic haulers in the area see a rise in cleaning after the advertisements are run. Health Department has the money to continue running ads through the end of the year. Thinks the cost is about $450 an ad.

SANILAC COUNTY DRAIN COMMISSIONER

Greg Alexander, Sanilac County Drain Commissioner
Website: https://www.sanilaccounty.net/publicpages/Entity.aspx?ID=198
Facebook: https://www.facebook.com/alexanderfordraincommissioner/
Twitter: none

Educational Activities Undertaken/Information Learned

- Sanilac County only has the Lake Huron shoreline; it does not have any inland lakes. The area is flat with the highest point at the headwaters of the Black River. Elk River is the biggest creek that flows into the Black River. Black River goes to Port Huron.
- Haven't formally engaged the public since 319 Watershed Advisory Grants in 2010. There was redundancy in training and meetings during this time. A few successful projects with the Watershed Advisory Council and Soil Conservation District fenced cattle away from drains. This funding dried up in 2012/13.
- Not aware of any active groups in the area. There was a little push from the Lexington area about 8 years ago but that has gone away.
- Watershed Advisory Council had 5-year plan that ended in 2016. It addressed invasive species (USACE involved), funding for cattle exclusion, abandoned water wells and city-wide septic system.
- Sanilac Health Dept. is extremely short-handed. Think they should have materials on septic maintenance. Suggested checking with them. (There were no materials on their website.)
- Created a 26-minute video on Sanilac County Parks using Sand Bay Productions. Paid $20,000 for video they guaranteed 20 spots on local PBS channels. Got more than 100 spots and every time it played he received a lot of phone calls. He used it for 5 years.
- Links to two videos on their website:
    - Michigan Drain Commissioner Informational Video (9:29) – Developed by Sand Bay Productions for the Michigan Association of County Drain Commissioners, explains how drainage system throughout the state developed under the Drain Code protects against flooding and supports agriculture.
    -
    - Cass River Virtual Tour Video (21:24) – Developed by Sand Bay Productions for Sanilac County Drain Commissioner. Addresses impacts to Cass River including sediment, water quality, runoff and nutrients. Covers agricultural BMPs – creek crossings, onsite basins and manure storage/usage. Explains MAEAP program. Covers role of the drain commissioner.

Advice/Suggestions for Reaching Local Audience

- Reach out to local audience through the radio stations – WMIC – AM, WTGV and 92.5 FM. Can go on AM channel and get a 15-minute spot for free – they treat it as a public service announcement.
- Share things on social media. Greg has a Drain Commissioner Facebook page where he shares/promotes different messages. He would share posts received. If have an appealing photo in your post, people will read it.
- No one has the patience to watch a 9-minute video (referring to MACDC video). Need it to be 2 minutes long.

GLWA
Great Lakes Water Authority

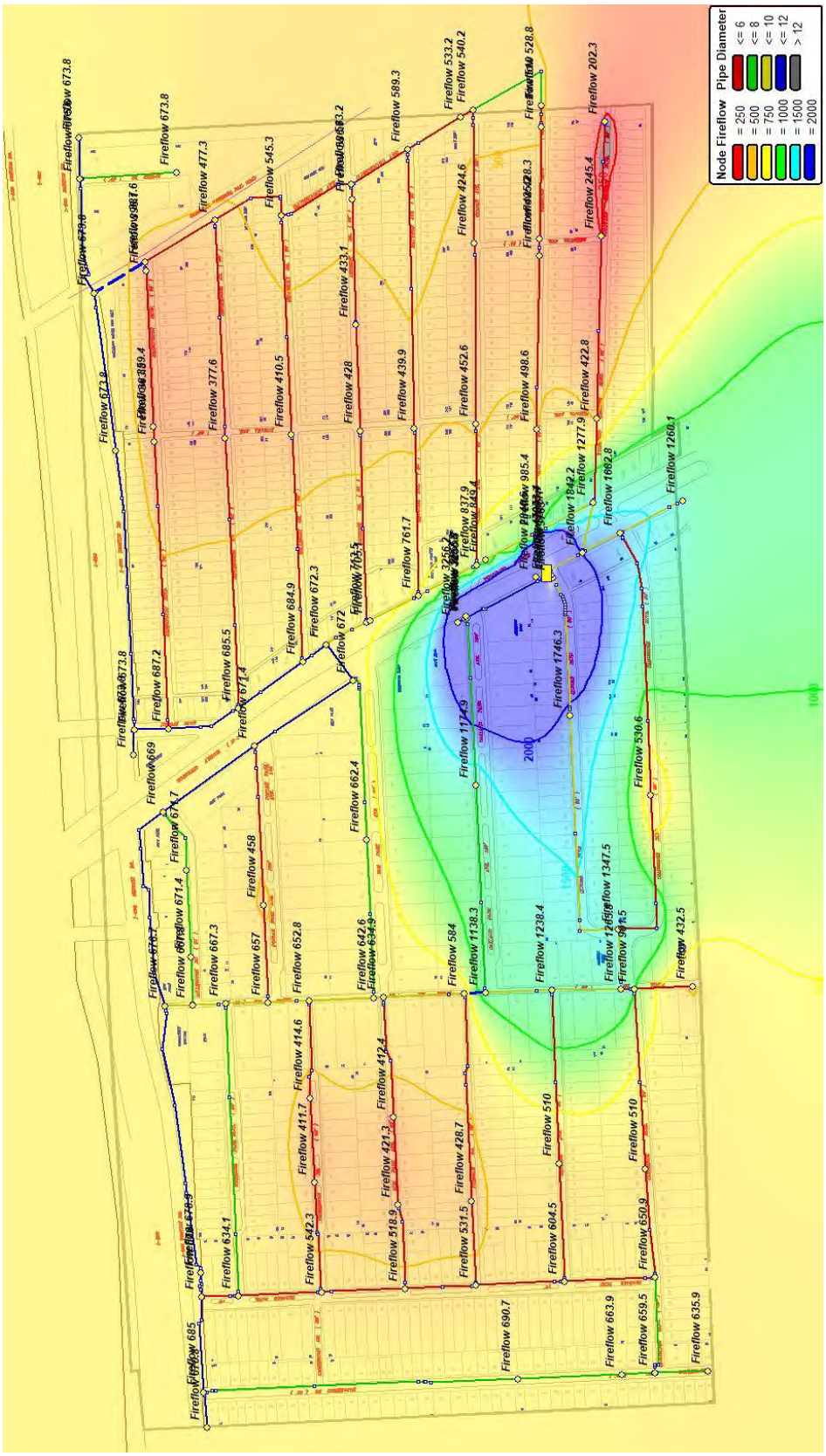
735 Randolph
Detroit, MI 48226

Arcadis of Michigan, LLC

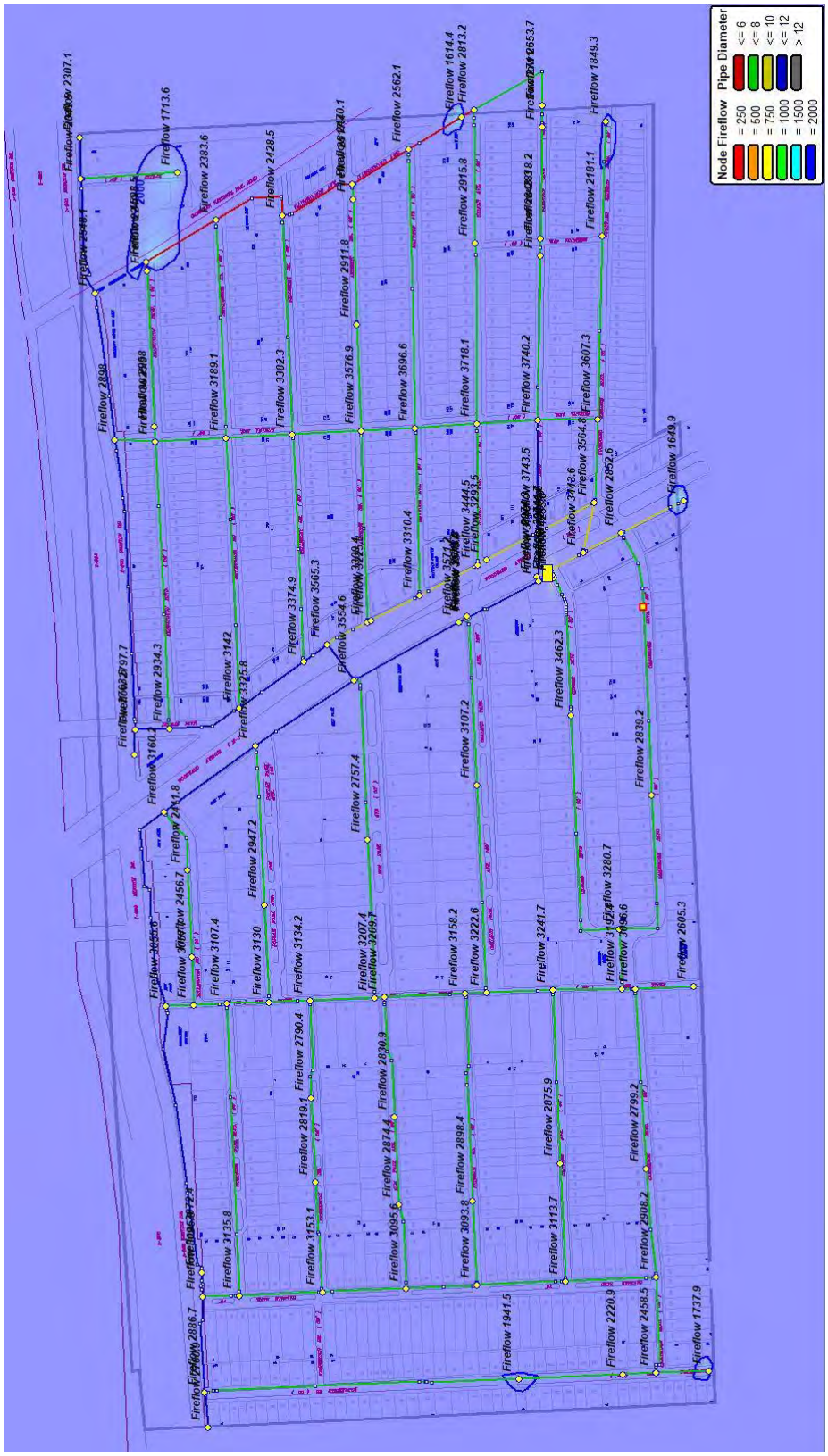
607 Shelby Street, Suite 400
Detroit Michigan 48226
Phone: 313 965 8436
Fax:
www.arcadis.com

APPENDIX J

Peak Hour, Fire Flow Conditions - Existing vs. Proposed



Existing Peak Hour Fire Flow at 20 P.S.I.



Proposed Peak Hour Fire Flow at 20 P.S.I. with improvements as identified within this report.

APPENDIX K

City of Pleasant Ridge Water Distribution System and Master Plan

Engineering Report

WATER DISTRIBUTION SYSTEM
Reliability Study and Master Plan

AEW No. 0175-0095

CITY OF PLEASANT RIDGE
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

January 2016

Civil Engineers
Surveyors
Architects

Anderson, Eckstein and Westrick, Inc.

Water Distribution System
Reliability Study and Master Plan

for the City of Pleasant Ridge

January 2016

Prepared for the City of Pleasant Ridge by:

Anderson, Eckstein and Westrick, Inc.
51301 Schoenherr Road
Shelby Township, Michigan 48315

AEW Job No. 0175-0095

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Appendix A *Existing Water Distribution System; Map and Hydrant Flow Test Data*

Appendix B *Existing Water Distribution System; Calibration Results*

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Appendix D *Existing Water Distribution System; Existing Maximum Day Demand Results*

Appendix E *Existing Water Distribution System; Existing Peak Hour Demand Results*

Appendix F *Interim Improvements Water Distribution System; Existing Maximum Day Demand Results*

Appendix G *Interim Improvements Water Distribution System; 2035 Maximum Day Demand Results*

Appendix H *Master Plan Improvements Water Distribution System; 2035 Maximum Day Demand Results*

Appendix I *Master Plan Improvements Water Distribution System; 2035 Maximum Day Demand Sensitivity Analysis Results*

Appendix J *Interim & Master Plan Capital Improvement Program*

Executive Summary

This study analyzes and evaluates the existing water distribution system in Pleasant Ridge. The analysis is performed with a pipe network analysis program, Pipe2014, professional version 7.022a, software by KYPipe LLC, using physical characteristics of the existing distribution system as input. Pipe2014 is a graphic user interface (GUI) for the KYPipe pipe network analysis engine/program developed at the University of Kentucky. The model outputs flow, pressure and head loss information for each pipe in the system. This output, State of Michigan Safe Drinking Water Act standards, fire flow requirements and fire insurance premium guidelines are the basis for system evaluation.

This study also develops and evaluates a master water distribution plan based on population projections, City needs and projected customer demands. The master distribution plan is modeled and evaluated for system performance and reliability.

Actual water consumption data from 2010-2014, provided by Southeastern Oakland County Water Authority, was reviewed by AEW. Average day demand is the annual consumption divided by 365 calendar days. Five (5) years of actual water consumption was averaged to generate the average day demand for the system. These values were compared to the contract values in Pleasant Ridge' water service contract with the Southeastern Oakland County Water Authority (SOCWA) and the theoretical demand associated with the design standard of 100 gallons per capita per day. The model incorporated the actual average day demand calculated from water consumption records.

Utilizing existing demand and peaking factors, a model of the existing water distribution system for Pleasant Ridge was developed with the use of Pipe2014 modeling software. The model was calibrated with data obtained from hydrant flow tests performed by AEW personnel on October 22nd, 2015.

The computer model was used to run steady state simulations of the existing system under average day, maximum day and peak hour demands. The existing system performed well with operating pressures in the range of 44.61 to 69.89 psi throughout the system.

Fire demand is simulated in the model by performing a Fire Flow and Hydrant Analysis. Fire Flow and Hydrant Analysis is a function of Pipe2014 that calculates the available fire flow at each model node based upon specified system conditions while maintaining a specified minimum pressure within the distribution system. Pressures below 20 psi anywhere within the system may allow for groundwater infiltration that could contaminate the water supply. As such, 20 psi is specified as the minimum system pressure for all Fire Flow and Hydrant Analyses.

Based on the model's output, it is immediately apparent the majority of the distribution system cannot provide the desired flow of 1,000 gpm to residential areas. The area between Ridge Road and Woodward Avenue, from Oakland Park to the South City Limits, is the only area where the model predicts hydrants have the capability of delivering the recommended fire flow while maintaining 20 psi within the distribution system. The

primary factor impacting available fire flow appears to be the age of the water mains and the prevalence of 6 inch water mains.

A five (5) year capital improvement program (CIP), based upon available funding, is recommended to improve available fire flow. Pleasant Ridge wishes to transition the 12 inch emergency connection to SOCWA on Eastbound 10 Mile Road (I-696 Service Drive) at Oakdale into a second SOCWA supply connection in continuous use. Transition to continuous use will require construction of a meter vault and a pressure reduction valve to control the supply pressure and balance the flows with the existing supply connection. The interim improvements proposed were added to the existing model to predict effect on the distribution system. The model was run for the existing maximum day scenario to determine in general how well the distribution system will theoretically work and to predict the available fire flow while maintaining 20 psi within the distribution system. Based on the model's output for this scenario, the water system, with interim improvements, continues to generally work well during the existing maximum day demand. Predicted pressures throughout the system ranged from 58.05 to 69.92 psi. Additionally, the available fire flow situation showed significant improvement. The model predicts almost all of Pleasant Ridge will be able to provide the desired flow of 1,000 gpm. Deficiencies in available fire flow remain in the southeastern corner of the City, primarily along the dead end water mains on Woodward Heights and Fairwood.

In addition to current demand, future (2035) demand from Pleasant Ridge was analyzed. The model, including the Interim Capital Improvement Program, was adjusted to reflect the future maximum day demand and 20 years of additional pipe aging. The model predicts the distribution system will continue to operate well during this future demand scenario. Predicted pressures throughout the system ranged from 58.03 to 69.84 psi. The model predicts the city-wide improvement with respect to available fire flow after the interim improvements generally remained despite the additional pipe aging and slight increase in demand. However, the deficiencies in predicted available fire flows in the southeastern corner of the City also remain.

Based upon results from the water distribution system model, replacement of the City's mains was further prioritized based on a number of factors. These factors include age, size, streets scheduled for repaving and the importance placed on the pipe by the model. A twenty (20) year master plan capital improvement program was developed through multiple iterations of the model and incorporated into the ultimate future model of the distribution system. This future distribution system, including all master plan proposed improvements, showed significant improvement in performance when analyzed under the future maximum day scenario. Predicted pressures ranged from 58.05 to 69.95 psi. Additionally, the model predicted significant improvement to available fire flow. The proposed variable minimum desired fire flows based on zoning are being met, city-wide, with the exception of a few dead end water mains where city limits restrict reasonable looping solutions.

Finally, a sensitivity analysis was performed to examine the future performance of the distribution system assuming all six (6) inch diameter water mains were replaced with eight (8) inch diameter, all cast iron pipes have been replaced with ductile iron water

mains and all pipes have a roughness ("C") factor of 90. The model was then run again for the future maximum day scenario to determine how these changes would impact the distribution system and the available fire flow while maintaining 20 psi within the system. Based on the model's output, the water distribution system continues to generally work well during the future maximum day demand. Predicted pressures throughout the system generally ran between 58.17 and 70.41. There were no deficiencies in predicted available fire flow within the system under these conditions, with all hydrants able to provide in excess of 3000 gpm.

Anderson, Eckstein and Westrick, Inc. recommends the following to maintain a safe, healthy and reliable public water distribution system:

- The Gate Valve and Hydrant Inspection and Exercise Program (CIP #2) should be implemented in 2016. Pleasant Ridge should inspect and exercise every gate valve and inspect and flush every hydrant in the City, and perform any repairs necessary (including replacement, if needed), to ensure they are fully operational within the next five (5) years. AEW recommends Pleasant Ridge establish five to ten "districts" and schedule 1 to 2 districts per year. This should be an annual program that is maintained perpetually after the initial inspections and repairs are completed. The schedule can be more aggressive if personnel and funding permits, but at minimum it is recommended that every valve and hydrant be inspected and exercised at least once every five years. (*)
- Initiate discussion with SOCWA related to transitioning the emergency connection at Eastbound 10 Mile Road and Oakdale into a second supply connection in continuous use (CIP#1). If SOCWA permits, this interim improvement would have the largest impact on improving available fire flow city-wide.
- Complete the three (3) projects identified as master plan improvements (CIP #3 – 5) within the next six (6) to twenty (20) years as the applicable street is repaved. (**)
- Continue and improve the methodical system of tracking detailed locations of water main breaks and repairs to identify and potentially re-prioritize aging water mains that should be retired and replaced. Existing pipe material and diameters should be noted during all repairs to improve the available "as-built" information about the distribution system.
- As a rule of thumb, aging water mains being retired should be replaced with a minimum 8 inch diameter pipe on all residential streets. The 10 inch to 12 inch transmission mains on Woodward Avenue and Oxford Boulevard are not proposed for replacement and the effects of a reduction in size has not yet been studied. If proposed due to reprioritizing, AEW can evaluate at that time.

(*) Staffing and budget issues, coupled with the size of the distribution system, may make programs to address <u>all</u> hydrants or valves annually unfeasible. At minimum, the system should be divided into districts such that annual programs address <u>all</u> hydrants and valves every five (5) years.

(**) Projects recommended for completion in years six (6) through twenty (20) may be reprioritized, and additional needs identified, based upon continued tracking of water main breaks.

The distribution system model created for this report is a valuable tool for future evaluation. Continued updates to the model are recommended as the distribution system is improved and as additional information becomes available. The information provided by future metered flows and hydrant flow tests will allow for continued refinement of the model's calibration and may assist with decision-making relative to identifying and prioritizing improvements.

Scope of Work

The Michigan Department of Environmental Quality (MDEQ) requires municipal consumers to conduct a Water Reliability Study and General Plan. The City of Pleasant Ridge engaged Anderson, Eckstein & Westrick, Inc. (AEW) to prepare a Water Reliability Study and General Study in accordance with Part 12 of the Administrative Rules promulgated under the Michigan Safe Drinking Water Act (1976 PA 399) and Master Plan for the municipal water distribution system. As part of this Water Reliability Study and General Plan, the City's system was modeled and evaluated for its ability to adequately serve its customers during peak periods, as well as provide firefighting capability while maintaining an adequate pressure in the system.

Since the City is completely built out and does not anticipate future expansion or other significant changes in demand, the City of Pleasant Ridge's master plan addresses looping, replacement and rehabilitation of aging water mains experiencing frequent water main breaks and upsizing of aging water mains to provide adequate pressure and capacity. The City's water main master plan was modeled to determine its effectiveness in improving the reliability of City water service.

Based on the model's results and information reported by the City's Water Department, the Southeastern Oakland County Water Authority (SOCWA), and the Royal Oak Department of Public Services (DPS), a 20 year capital improvement plan was developed.

Governing Standards

Accepted design standards, in accordance with the Michigan Safe Drinking Water Act, require distribution systems to have sufficient capacity to meet instantaneous peak demands, including fire flow demands. These standards also suggest that normal working pressure not fall below 35 pounds per square inch (psi). Under peak demand, including fire flow, 20 psi must be maintained at all times throughout the system. Pressures below 20 psi may allow for groundwater infiltration into the water system, resulting in contamination of the water supply.

Beyond safe drinking water standards, fire insurance premiums also influence water system planning and design. Fire flow requirements of the rating agencies reflect the generally conservative nature of the insurance business. Minimum fire insurance premiums require very large fire flows. These flows must be in quantities and pressures and for durations acceptable to the insurance companies. The National Fire Protection Association (NFPA) and the Insurance Services Office (ISO) publish data on the fire flow requirements necessary to qualify property for minimum fire insurance rates.

The length of time for which the required flows must be available varies. The distribution system must provide the minimum required fire flow of 500 gallons per minute (gpm) for at least 2 hours and the maximum flow of 12,000 gpm for 10 hours. The latter rate and duration draws over 7 million gallons of water from the supply system. Few systems are designed to deliver maximum flow rates. Economic constraints preclude construction of the storage and pumping facilities and the large diameter mains needed to deliver such

a large amount of water in the given time period. Thus, the design of municipal water systems balances the cost of constructing the system with the benefit of reduced insurance premiums, which results in a more realistic and economical system at the cost of greater fire insurance risk.

Although most water supply systems do not minimize the fire insurance risk to business, businesses do have options available to them to further reduce their risk. If zoning permits, buildings may be sited so they do not pose a risk to adjacent buildings. Businesses may also construct water storage facilities for firefighting, or install automatic sprinkler systems. All of these measures keep losses in a fire and insurance premiums to a minimum.

Pleasant Ridge desires the following minimum available fire flow, based on zoning, for analysis.

Zoning	Demand (gpm)
Single Family and Duplexes	1000
Multi- Family and Commercial	2000
Industrial	3000

Table 1 – Fire Flow Demand Based on Zoning

Current Flow Demands

Background

The City of Pleasant Ridge encompasses approximately 0.57 square miles in southeastern Oakland County. Development in the City consists primarily of single family residential areas. Commercial development lies predominately along northbound Woodward Avenue. There is some light industrial development along the CN Railroad ROW at the northeastern corner of the City.

The residential population for Pleasant Ridge, based on the 2010 Census is 2,526 people. Seasonal fluctuations are negligible. Table 2 presents the estimated existing population for the study area, based on Census 2000 and Census 2010.

Census 2000	2,594	people
Census 2010	2,526	people

Table 2 – City Wide Population

The Southeast Michigan Council of Governments (SEMCOG) develops population projections as part of their regional planning for Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw and Wayne Counties. SEMCOG uses the most recent U.S. census figures as the basis of their projections. SEMCOG provides the population projections for Pleasant Ridge for the current year as well as the next 5, 10, 15, 20 and 25 years from 2015. The estimated populations presented in Table 3 are based on SEMCOG's 2040 Forecast produced in 2012, and should not be directly compared to Census 2000 and Census 2010 numbers.

2015	2,476	people
2020	2,399	people
2025	2,429	people
2030	2,378	people
2035	2,415	people
2040	2,370	people

Table 3 – Estimated Population, SEMCOG 2040 Forecast

User Demand

Actual Pleasant Ridge water purchase data from 2010-2014 was reviewed by AEW. Average day demand is the annual consumption divided by 365 calendar days. Five (5) years of actual water purchase was averaged to generate an average day demand of 0.238 million gallons per day (mgd). Pleasant Ridge contracts with the Southeastern Oakland County Water Authority (SOCWA) for long term delivery of up to 1.96 mgd of potable water through a contract that dates back to April 14, 1960. SOCWA maintains a water supply system for the purposes of transporting, pumping and storing the potable water received under SOCWA's contract with the City of Detroit's Water and Sewerage Department (DWSD) for delivery to Pleasant Ridge and all members of SOCWA. This study accordingly uses 0.238 mgd as the average daily demand.

Maximum day demand illustrates the Pleasant Ridge demand that would usually be applied during the theoretical "worst" day per year, averaged over a 24 hour period. This would simulate a worst case scenario: a hot, dry summer day when many people are watering lawns, filling swimming pools and washing cars in addition to their usual water consumption for showers, toilets, laundry, dishes and other household activities. It would also include the night hours, when water consumption is lower. Maximum day demand, based upon actual water purchases from 2012-2014, was available from SOCWA. The three (3) year average maximum day demand was 0.490 mgd. This equates to an average day to maximum day peaking factor of 2.06 for the City of Pleasant Ridge. This study incorporates a more conservative maximum day peaking factor of 2.5 which equates to a maximum day demand of 0.595 mgd.

Peak hour demand illustrates demand on the system that would be applied during the peak hour. This would most likely occur during the morning hours when water consumption is high due to morning showers, cooking, lawn sprinkling, etc. and often occurs on the maximum day. The peak hour may also occur early each evening when water consumption is high due to dinner preparation, dishes, laundry, lawn sprinkling, evening showers, etc. and also often occurs on the maximum day. Metered flow, reported in cubic feet per minute (CFM), was provided by SOCWA for the maximum day water purchases for the years 2012-2014. The three (3) year average peak hour demand was 0.940 mgd. This equates to an average day to peak hour peaking factor of 3.95 for the City of Pleasant Ridge. This study incorporates a slightly more conservative peak hour peaking factor of 4.0 which equates to a peak hour demand of 0.952 mgd. The average day, maximum day, and peak hour demands used for this study are presented in the table below.

Existing Demands (mgd)		
Average Day	**Maximum Day**	**Peak Hour**
0.238	(x2.5) = 0.595	(x4.0) = 0.952

Table 4 – Summary of Existing System Model Demands

Additionally, the Pleasant Ridge Water Department reviewed August 2012 through July 2015 water billing records for every commercial account to identify their annual demand. A summary of these 23 customers is presented in Table 5.

Customer	Address	Demand (gpm)
Vogue Vintage	23622 Woodward	0.014
Occupant	23634 Woodward	0.062
Occupant	23647 Woodward	0.073
Occupant	23650 Woodward	0.206
Occupant	23701 Woodward	0.338
Occupant	23733 Woodward	0.058
Occupant	23900 Woodward	0.037
Occupant	23906 Woodward	0.040
Occupant	23908 Woodward	0.052
Occupant	24052 Woodward	0.047
Occupant	24126 Woodward	0.052
Occupant	24200 Woodward	0.087
Occupant	23700 Woodward	0.031
Romano Law	23880 Woodward	0.052
Valter Xhomaqi	24060 Woodward	0.385
Occupant	24100 Woodward	0.234
Occupant	24280 Woodward	0.331
Occupant	24242 Woodward	0.037
Comerica Bank	24028 Woodward	0.069
Occupant	23810 Woodward	0.707
Occupant	23708 Woodward	0.139
Hello World	404 E. 10 Mile Road	0.437
Walker Wire – Mittal	660 E. 10 Mile Road	0.003
	TOTAL	**3.494**

Table 5 - Commercial Water Consumers based upon 2012-2015 Billings in the City of Pleasant Ridge

Ten States Standards dictates a design average day of 100 gallons per capita per day (gcd). For a population of 2,476 (2015 SEMCOG Projection), the design average day demand calculates as 0.248 mgd. For purposes of accurately modeling the existing system, the demands calculated from actual records of consumption from the City of Pleasant Ridge (Table 4) were used rather than theoretical demand. The demand of the commercial customers was deducted from the average day demand within the City. The remaining demand was then divided by the SEMCOG number of single family, duplex, townhouses and attached condominium housing units. Based on this data, 1,170 metered service connections utilized an average of 0.233 mgd of water. Using the SEMCOG average household size of 2.23, this calculates to roughly 89.29 gcd, 199.12 gallons per

day per household unit or 0.1383 gpm for each residential meter. This value was assigned as the average day demand for each residential meter within the model.

Note that system demand was based upon wholesale data. The methodology referenced above includes line losses and other unallocated water losses in the residential meters to distribute proportionately throughout the system.

Pleasant Ridge aerial records and parcel maps were reviewed and compared to the water distribution model. Each recorded demand from the 23 commercial customers was placed at the node in the model nearest the location of the actual customer. The number of readily identifiable household units adjacent to each section of water main was then counted and a corresponding number of residential meters were assigned to the applicable pipe section. The total demand from the 23 commercial customers and the identified household units was then deducted from the known total demand within the City. This remaining unallocated demand was then assigned to various nodes within the model based upon locations of multi-unit housing developments and community gathering facilities such as the Community Center/Pool.

Fire Demand

Fire demand is the demand placed on the system when a fire occurs in the City. This demand is imposed at a single point in the system and varies based on the nature of the fire. Typically, fire demand is less in residential areas than in commercial and industrial areas due to smaller structures in residential areas which hold fewer flammable materials. Desired available fire flow for each type of zoning is listed in Table 6.

Zoning	Demand (gpm)
Single Family and Duplexes	1000
Multi- Family and Commercial	2000
Industrial	3000

Table 6 – Fire Flow Demand Based on Zoning

Fire demand is simulated in the model by performing a Fire Flow and Hydrant Analysis. Fire Flow and Hydrant Analysis is a function of Pipe2014 that calculates the available fire flow at each model node based upon specified system conditions while maintaining a specified minimum pressure within the distribution system. Pressures below 20 psi anywhere within the system may allow for groundwater infiltration that could contaminate the water supply. As such, 20 psi is specified as the minimum system pressure for all Fire Flow and Hydrant Analysis. Available fire flow is analyzed in the existing, interim and future models (under average day, maximum day, and peak hour demands) to evaluate the distribution system for its ability to provide fire flow.

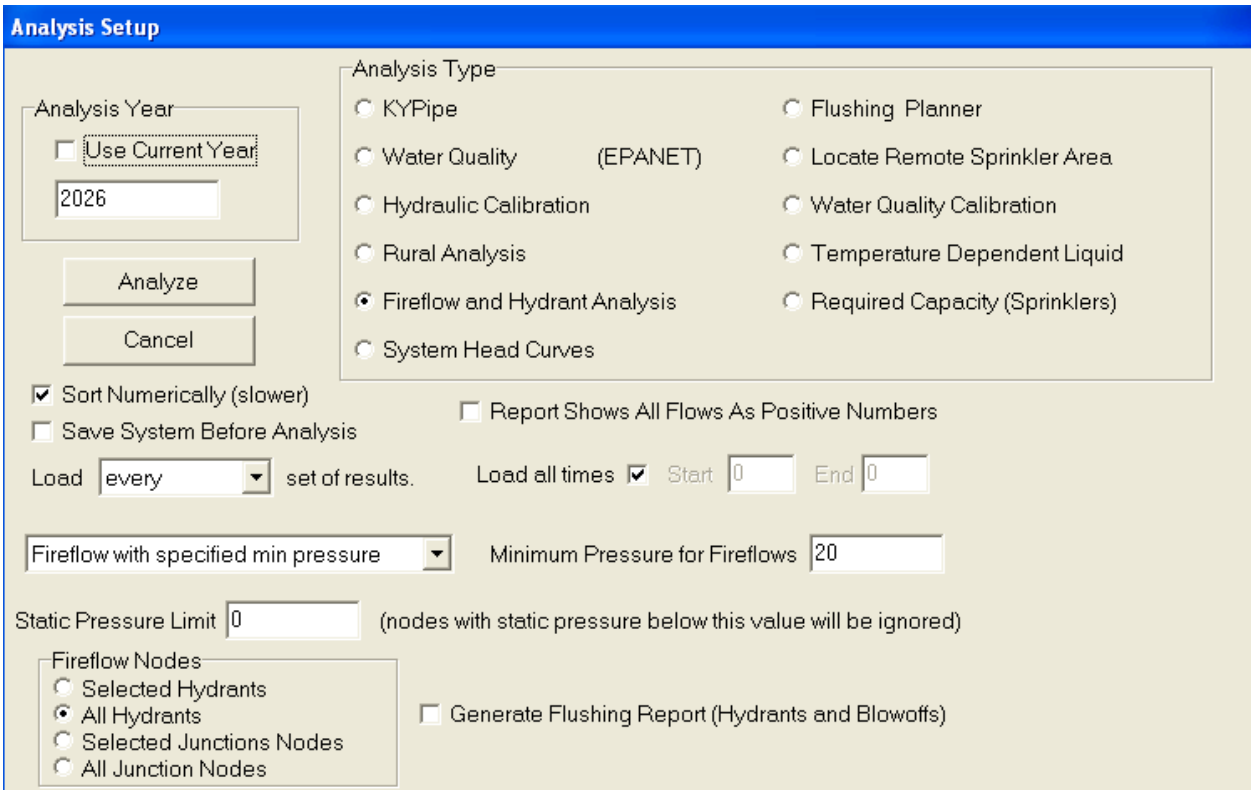

Figure 1 – Sample Fire Flow and Hydrant Analysis Set-up Screen

Existing System

System Overview

The City of Pleasant Ridge receives water from SOCWA. Water is delivered by SOCWA to Pleasant Ridge through one (1) metered connection to a SOCWA Transmission Main. The meter location is as follows:

- PR-01 – 12 inch Connection from 30 inch SOCWA Transmission Main to a Meter Pit located at Woodward Avenue and Oxford Boulevard.

There are four (4) emergency connections in the event of a loss of water service at PR-01:

- 12 inch Connection to Ferndale on Eastbound 10 Mile at Eprize
- 10 inch Connection to Ferndale on Woodward South of Cambridge
- 6 inch Connection to Ferndale on Fairwood at Gainsboro
- 12 inch Connection to SOCWA on Eastbound 10 Mile at Oakdale (Gates on North and South side of I-696)

No other sources of supply such as pumps, wells or water storage exist. SOCWA and Pleasant Ridge report supply pressure typically ranges in the high 60's psi. AEW reviewed 24 hours of supply pressure data reported in one (1) minute increments to further supplement the available supply information.

Parameter	PR-01
Pressure Min. (psi)	62
Pressure Max. (psi)	72
Pressure Mode (psi)	68
Pressure Average (psi)	67.02

Table 7 – SOCWA Supply Parameters

As previously discussed, the existing average day demand was determined by analysis of water consumption data from 2010-2014. Future demand was estimated by applying the design standard of 100 gallons per capita per day to the SEMCOG 2035 population projection. Future maximum day and peak hour demands were estimated by application of the peaking factors previously discussed.

Calendar Year	Model Demands (mgd)		
	Average Day	Maximum Day	Peak Hour
2015	0.238	0.595	0.952
2035	0.242	0.604	0.966

Table 8 – Summary of Existing and Future Model Demands

Calendar Year	Pressure Range (psi)			
	Meter PR-01			
	Min.	Max.	Avg.	Mode
2015	62	72	67.02	68
2035	62	72	67.02	68

Table 9 – Supply Pressures

The City of Pleasant Ridge is a fully developed community, containing a network of approximately 10.57 miles of water distribution mains throughout the entire community ranging from six (6) inches in diameter to twelve (12) inches in diameter. The system provides water service to approximately 1,170 residential and 23 commercial service connections. The City of Pleasant Ridge contracts with the City of Royal Oak DPS to provide operation and maintenance of the Pleasant Ridge water distribution system.

AEW has detailed information about water mains constructed since 1995. Additionally, AEW reviewed the archives of Pate, Hirn & Bogue, Inc. (Pleasant Ridge consulting engineer prior to AEW) to get detailed information about any water mains constructed between 1961 and 1995. However, the City experiences relatively few water main breaks and has not replaced any water mains in the last 50+ years due to performance or reliability issues. The only water main renewals have been associated with the work of outside agencies. The Michigan Department of Transportation replaced almost 3,000 feet of 12 inch water main in the 10 Mile Road (I-696 Service Drive) Right-of-Way (ROW) in 1985. SOCWA replaced approximately 17 feet of 12 inch water main adjacent to the water meter at Woodward and Oxford in 2000 when they renewed their 30 inch transition main. The only information available for the majority of the water mains within the distribution system was location and diameter. Pleasant Ridge and Royal Oak personnel assume the water distribution system in Pleasant Ridge to be circa 1920.

The model incorporates pipe ages based upon these references. As can be seen in Table 10 below, almost 95% of the water mains have an assumed construction date of very limited accuracy.

Age (Assumed)	Miles of Pipe	% of Current System
1920's	10.01	94.69
1985	0.56	5.28
2000	0.00	0.03
Total	10.57	100.00

Table 10 – History of Water Distribution System Development

As such, water main conditions range from poor to good. Water mains constructed prior to 1985 are assumed to be cast iron.

Maps showing the existing water distribution system are provided in Appendix A. A summary of water mains, based upon available records and assumptions, is presented below.

Pipe Material	Approximate Length (feet)
Cast Iron	52,838
Ductile Iron	2,963
Total Footage	**55,801**

Table 11 - Summary of Water Mains by Pipe Material

Pipe Diameter (inches)	Approximate Length (feet)
6	31,277
8	8,277
10	7,621
12	8,626
Total Footage	**55,801**

Table 12 - Summary of Water Mains by Pipe Diameter

Pipe Material	Dia. (in)	Approx. Length (feet)
Cast Iron	6	31,277
Cast Iron	8	8,277
Cast Iron	10	7,621
Cast Iron	12	5,664
Ductile Iron	12	2,962
Total Footage		**55,801**

Table 13 - Summary of Water Mains by Diameter and Pipe Material

Firefighting demand can severely reduce pressures in a system of small diameter pipe. Undersized pipe results in excessive head loss and a corresponding decrease in flow, even when adequate pressures are maintained in larger, nearby mains. Industry standards recommend a minimum size pipe of 6 inches. However, many communities in southeast Michigan have installed nothing smaller than 8 inch diameter pipe in recent years, to ensure adequate flows and pressures. The City's water main system is extensively looped, but more than 5.9 miles of water mains in the system are still 6 inch diameter, which could present a problem, especially as the aging system continues to deteriorate.

The pictures below show tuberculation in 6 inch cast iron water mains that had been in service over 50 years. The picture on the left is a water main that was removed in October 2015 in the City of Fraser, approximately 12 miles Northeast of Pleasant Ridge. The middle and right pictures are a water main that was removed a few years ago in Clawson, approximately 5 miles due North of Pleasant Ridge. The pictures show approximately 1/3 of the pipes' cross sections are encumbered with scale buildup, effectively causing the mains to become undersized over time.

Picture 1 – 50+ Year-old 6 inch Cast Iron Water Mains

Model Development

The model of the existing water distribution system was developed with the pipe network analysis program, Pipe2014, professional version 7.022a, software by KYPipe LLC. Pipe2014 is a graphic user interface (GUI) for the KYPipe pipe network analysis engine/program developed at the University of Kentucky. This program performs regular simulations of steady state pressure and flow in pipe networks transporting liquids. The Pipe2014 program is extremely powerful and capable of modeling very complex pipe networks.

As powerful as Pipe2014 is, accurate data input to the program is essential to obtain meaningful results. Every effort was made in configuring the model to accurately reflect the existing system. Water main layout was entered based upon system maps provided by the City of Pleasant Ridge. These system maps included pipe diameter, hydrant and valve locations. A master list of installation year and pipe material for the water distribution system, by street, is unavailable. The previous section of this report outlines the archive and reference resource searches and the assumptions used to acquire additional data on pipe materials and age of construction. Construction year is useful data as Pipe2014 adjusts pipe roughness C-factors based upon age. Pipe layout was drawn to the scale of

the map provided. Minor losses were incorporated by including pipe fittings (bends, tees, valves, etc.) on the applicable pipes.

Elevation for node pressure junctions were assumed to be at ground level. Node elevations were interpolated from Google Earth Pro software version 7.1.2.2041.

Demands were allocated throughout the system as previously discussed.

The SOCWA supply is represented in the model by a reservoir at the connection point. Use of a reservoir as the supply allows grade adjustments to easily edit the supply pressure based upon conditions. Supply pressures used in the model was the average daily supply pressure. The following is a summary of the pressures entering the system at each connection point in model.

Meter	Location	Meter Elev. (ft)	Hydraulic Grade (ft)	Pressure (psi)
PR-01	Woodward and Oxford	648.0	802.77	67.0

Table 14 – SOCWA Supply at Connection Point

Fire hydrant flow tests are an essential tool used in calibrating the computer model. These tests provide actual data on the system's performance, including static pressures within the system, residual pressures while the system is under demand, flows produced by measured drops in system pressure and estimates of the condition of the interior smoothness of the pipe in the system. From the results of a hydrant flow test, the theoretical flow available from the system may be calculated at any residual pressure desired. The formula used to calculate the theoretical flow is as follows:

$$Q_R = Q_F \times \frac{H_R^{0.54}}{H_F^{0.54}}$$

where:

Q_R = theoretical flow at the desired residual pressure

Q_F = actual flow measured during the test

H_R = the drop in pressure from static to desired residual

H_F = the drop in pressure from static to actual residual during the test

In order to provide standardized results from hydrant flow tests, flows are calculated from the above formula at a desired residual pressure of 20 psi. This pressure is chosen because public health guidelines require water distribution systems to maintain a minimum of 20 psi during fire flow events. This minimum residual pressure provides protection against backflow and possible system contamination.

Eight (8) hydrant flow tests were performed by AEW personnel on October 22nd, 2015. The hydrant test results are included in Appendix A. A summary of the test results, including the theoretical fire flow available at 20 psi under conditions at the time of testing, is presented in the table below.

Test No.	Flow Hydrant Test Location	Residual Hydrant		Flow (gpm)	GPM @ 20 psi residual
		Static Pressure (psi)	Residual Pressure (psi)		
1	8 Millington	56	7	840	700
2	4 Kenberton	59	17	530	500
3	139 Maplefield	59	12	760	700
4	111 Elm Park	57	17	530	500
5	24060 Woodward (@Amherst)	62	12	1310	1200
6	42 Fairwood	62	36	530	700
7	60 Amherst	64	40	380	500
8	99 Kensington	61	12	530	500

Table 15 – Hydrant Flow Test Data Summary

To calibrate the model, Pipe2014 uses a function called “calibration wizard”. Each pipe within the distribution system is assigned a calibration group based upon similar diameter and pipe material. Flow test results are then entered into this function as a separate “case” for each test. The discharge measured during the test was input as a demand at the model node corresponding to the flow hydrant, the residual pressure measured during the test was input at the model node corresponding to the residual hydrant, and the static pressure at the SOCWS connection was entered by editing the reservoir grade. Instantaneous supply pressures at the SOCWA supply meter are recorded every minute by SOCWA. SOCWA provided this information to allow for accurate simulation of the boundary conditions at the time tests were conducted.

The “calibration wizard” then analyzed the system for each separate “case” to compare predicted pressures to actual test pressures measured during hydrant flow testing. Any discrepancy between the actual test pressure and the computer model’s predicted pressure is minimized by applying an adjustment factor to the pipe roughness C-factors of each calibration group. Pipe2014 continues to run iterations until the difference between actual and predicted pressures cannot be further minimized.

If standard deviation is more than desired, results are discarded and revisions are made before running “calibration wizard” again. Revisions include: editing elevations, assigning additional line losses to significantly aged pipes, reviewing the accuracy of pipe interconnections and closing pipes to simulate broken or closed valves in the system. The Royal Oak DPS was not aware of any known or suspected valves broken in the closed position.

The City of Pleasant Ridge does not presently have a regularly scheduled program to exercise and inspect system valves. There is a distinct possibility of valves that are unknowingly closed or “failed” in the closed position due to age. The fact the distribution system is well looped would prevent identification of these closures unless there are two adjacent closures or a program to periodically exercise and inspect all valves. Trial and error determined model accuracy was improved by closing the following valves:

6 inch Water Main between 10 Mile Road and Kensington along CN Railroad ROW
10 inch Water Main between Norwich and Oakland Park along Ridge Road

It must be noted there is insufficient evidence to identify these two locations as the specific location of a valve closure and/or failure, or that there are only two locations within the distribution system. Numerous locations and combinations of locations were simulated as valve closures with limited improvement in accuracy. However, when these two locations were simulated together, model accuracy improved from a standard deviation of 29.188% to 7.870%

The predicted residual pressures approximate those actually measured in the field with a 7.875% deviation. The results obtained from the model correlate generally well with the actual results. The table below compares the actual hydrant flow test results with the computer model's results. Hydrant flow test 2 was omitted from the calibration data as the results were identical to Hydrant flow test 4 as it was only one block north, on a similarly aged 6 inch diameter water main and had identical results. Hydrant flow test 6 was omitted from the calibration data as it was a dead end water main. Computer model calibration results are presented in Appendix B.

Hydrant Flow Test No.	Model Residual Node	Residual Pressure (psi)	
		Test	Model
1	J-69	7	5.8
2	Omitted from Calibration		
3	J-74	12	7.2
4	J-76	17	16.3
5	J-78	12	13.5
6	Omitted from Calibration		
7	J-81	40	50.1
8	J-83	12	11.4

Table 16 – Comparison of Actual vs. Predicted Hydrant Flow Test Results

Differences in residual pressure could reflect actual demands at the time of the tests varying from the average demand calculated from records. The average demand neglects the time-dependent nature of actual water usage, but that is a consistent source of deviation in all models. Specific deviation may also be caused by the instantaneous point demands from flow tests being impacted by the location of the valve "closures" within the model or by additional valve closure and/or failure. Additionally, the fact that 95% of the water mains in the model are of similarly assumed age and material will limit the potential accuracy.

However, the calibration tests show the model can predict generally well the system's response to varying demands when used as a "snap shot" of steady state conditions. Further refinement to the model would require extensive field surveying and additional hydrant flow testing with no certainty of improvement. Improved accuracy may not be possible without extensive excavation to verify pipe material and better estimate age of construction. Considering the City is fully developed without the capacity for large scale

development of new demands, the model can reliably indicate the system's performance and impacts of water main replacement projects.

Results

Average Day

The existing model was run for the average day scenario to determine in general how well the distribution system is currently working and calculate the available fire flow while maintaining 20 psi within the distribution system. Running the model requires system conditions at the time of the simulation. This required specification of system demand and pressure at the SOCWA supply. System demand under the average day conditions was allocated as discussed earlier in this report. The simulation was performed using the SOCWA supply pressure as shown in Table 14.

Steady state simulation results are presented in Appendix C. The existing water system operates well during the average day demand. Pressures throughout the system ranged from 57.21 to 69.89 psi and are graphically depicted through use of color gradients in Appendix C. However, when analyzing for available fire flow it is immediately apparent the majority of the distribution system cannot provide the desired flow of 1,000 gpm to residential areas. The area between Ridge Road and Woodward Avenue, from Oakland Park to the South City Limits, is the only area where the model predicts hydrants have the capability of delivering the recommended fire flow while maintaining 20 psi within the distribution system.

Available fire flow throughout the distribution system is depicted graphically through the use of colored gradients and is included in Appendix C. Generally speaking, areas trending from yellow toward the blue spectrum are good (can provide fire flow that exceeds 1,000 gpm). Areas trending toward the red spectrum are areas of concern (cannot provide the minimum 1,000 gpm fire flow required for residential zoning). The primary factor impacting available fire flow appears to be the age of the water mains and the prevalence of 6 inch water mains.

Maximum Day

The existing model was run for the maximum day scenario to determine in general how well the distribution system is currently working and calculate the available fire flow while maintaining 20 psi within the distribution system. System demand under the maximum day conditions was achieved by applying a global demand factor to the model. This increased the model's system-wide demand to match the maximum day demand while maintaining the distribution that was applied to the average day model (allocated as discussed earlier in this report). The simulation was performed using the SOCWA supply pressure as shown in Table 14.

Steady state simulation results are presented in Appendix D. The existing water system operates generally well during the maximum day demand. Pressures throughout the system ranged from 52.55 to 68.44 psi and are graphically depicted through use of color gradients in Appendix D. The city-wide deficiency in available fire flow remained, with the exception of the area bounded by Ridge Road and Woodward Avenue from Oakland Park to the South City Limits. However, this region where the model predicts hydrants are

capable of delivering the recommended fire flow appeared to slightly contract while the deficiency throughout the rest of the City worsened. A graphic depiction of available fire flow is also included in Appendix D.

Peak Hour

The existing model was run for the peak hour scenario to determine in general how well the distribution system is currently working and calculate the available fire flow while maintaining 20 psi within the distribution system. System demand under the peak conditions was achieved by applying a global demand factor to the model. This increased the model's system-wide demand to match the peak hour demand while maintaining the distribution that was applied to the average day and maximum day models (allocated as discussed earlier in this report). The simulation was performed using the SOCWA supply pressure as shown in Table 14.

Steady state simulation results are presented in Appendix E. The existing water system operates generally well during the peak hour demand. Pressures throughout the system ranged from 44.61 to 67.07 psi and are graphically depicted through use of color gradients in Appendix E. The city-wide deficiency in available fire flow remained, with the exception of the area bounded by Ridge Road and Woodward Avenue from Oakland Park to the South City Limits. However, this region where the model predicts hydrants are capable of delivering the recommended fire flow appeared to contract further while the deficiency throughout the rest of the City worsened. The model predicts the majority of the city, serviced by aging 6 inch water mains, cannot provide even 500 gpm. A graphic depiction of available fire flow is also included in Appendix E.

Interim Improvements

Proposed Improvements

A five (5) year Capital Improvement Program (CIP), based upon available funding, is recommended to improve available fire flow. Pleasant Ridge wishes to transition the 12 inch emergency connection to SOCWA on Eastbound 10 Mile Road (I-696 Service Drive) at Oakdale (Gates on North and South side of I-696) into a second SOCWA supply connection in continuous use (tentative designation PR-02). Transition to continuous use will require construction of a meter vault and a pressure reduction valve to control the supply pressure and balance the flows with PR-01. The proposed interim improvements are as follows:

CIP#	Limits	Diameter (in)		Length (ft)	Year Installed
		Ex.	Prop.		
1	Additional SOCWA Supply	12	12	n/a	1985
2	Gate Valve & Hydrant Inspection/Exercise	City-wide			

Table 17 – Proposed Interim Capital Improvement Plan

Maps showing the interim improvements water distribution system are provided in Appendix J.

Results

Maximum Day for Interim Improvements

The interim improvements proposed were added to the existing model to predict effect on the distribution system. The model was run for the existing maximum day scenario to determine in general how well the distribution system will theoretically work and to predict the available fire flow while maintaining 20 psi within the distribution system. System demand under the maximum day conditions was achieved by applying a global demand factor to the model. This increased the model's system-wide demand to match the maximum day demand while maintaining the distribution that was applied to the previous existing system models (allocated as discussed earlier in this report). The simulation was performed using the SOCWA supply pressure at PR-01 as shown in Table 14 while the pressure at PR-02 was set at 62.65.

Based on the model's output (Appendix F), the water system, with interim improvements, continues to generally work well during the existing maximum day demand. Predicted pressures throughout the system ranged from 58.05 to 69.92 psi, an increase from the results prior to the interim improvements. Additionally, the available fire flow situation showed significant improvement. The model predicts almost all of Pleasant Ridge will be able to provide the desired flow of 1,000 gpm. Deficiencies in available fire flow remain in the southeastern corner of the City, primarily along the dead end water mains on Woodward Heights and Fairwood. Graphic depictions of pressures and available fire flow are also included in Appendix F. Note the model predicts the maximum day demand was serviced almost equally between the two supplies with 49% of the flow through PR-01 and 51% of the flow through the new PR-02 under these conditions.

Future System

Future System Overview

The future model incorporated the interim improvements noted previously. Additionally, the roughness values determined during calibration of the existing model were reduced by five percent (5%) to simulate an additional 20 years of aging on the distribution system.

Future Demand

Pleasant Ridge is fully developed and no significant changes to the City's water demand are anticipated in the future. As noted earlier, SEMCOG forecasts the population to decline over the next 20 years.

2015	2,476	people
2020	2,399	people
2025	2,429	people
2030	2,378	people
2035	2,415	people
2040	2,370	people

Table 3 – Estimated Population, SEMCOG 2040 Forecast

These forecasts project a 2.5% decrease in population over the next twenty (20) years. This model applies the design standard of 100 gcd to the projected 2035 population to arrive at a 2035 average day demand of 0.242 mgd. Once again the ratio of maximum day demand to average day demand was assumed to be 2.5 and the ratio of peak hour demand to average day demand was assumed to be 4.0. The values used for this study are presented again in the tables below.

Calendar Year	Model Demands (mgd)		
	Average Day	Maximum Day	Peak Hour
2015	0.238	0.595	0.952
2035	0.242	0.604	0.966

Table 8 – Summary of Existing and Future Model Demands

Calendar Year	Pressure Range (psi)			
	Meter PR-01			
	Min.	Max.	Avg.	Mode
2015	62	72	67.02	68
2035	62	72	67.02	68

Table 9 – Supply Pressures

This total average day demand was then allocated to the future model. Recorded demands from the commercial customers remained unchanged in the future model. While ownership and some relocation of demand is likely, it is assumed that current records will be representative of both quantity and general distribution within the City. The number and location of residential meters remained constant, but the demand was adjusted. The demand from the commercial customers was deducted from the future average day demand within the City. The remaining demand was then divided by the SEMCOG number of single family, duplex, townhouse and attached condominium housing units. Based on this data, 1,170 metered service connections will utilize an average of 202.11 gpd, or 0.1404 gpm for each residential meter. This value was assigned as the average day demand for each residential meter within the model.

Results

Future Maximum Day for Interim Improvements

The future model was run for the maximum day scenario to predict in general how well the distribution system will work and the available fire flow while maintaining 20 psi within the distribution system. System demand under the maximum day conditions was achieved by applying a global demand factor to the model. This increased the model's system-wide demand to match the future maximum day demand while maintaining the distribution that was applied as discussed above. The simulation was performed using the SOCWA supply pressure at PR-01 as shown in Table 14 while the pressure at PR-02 was set at 62.65.

Based on the model's output (Appendix G), the water system, with interim improvements, generally works well during the future maximum day demand. Predicted pressures throughout the system generally ran between 58.03 and 69.84 psi, a slight decrease from the 58.05 to 69.92 psi range predicted prior to 20 years additional pipe aging. Additionally,

the city-wide improvement with respect to available fire flow after the interim improvements generally remained despite the additional pipe aging and slight increase in demand. However, the deficiencies in predicted available fire flows in the southeastern corner of the City also remain. Graphic depictions of pressures and available fire flow are also included in Appendix G. Note the model predicts the future maximum day demand will continue to be serviced almost equally between the two supplies with 49% of the flow through PR-01 and 51% of the flow through the new PR-02 under these conditions.

Master Planning

20 Year Capital Improvement Program

Despite the advanced age of the majority of the water distribution system, Pleasant Ridge experiences relatively few water main breaks. This is most likely the result of two factors. First, the soils in Pleasant Ridge are loamy sand (Spinks and Thetford complex soils) which drain quickly and do not retain a large amount of water. Second, the localized effects of I-696 and the Woodward underpass. The excavation and drainage systems associated with those projects has lowered the water table.

Pleasant Ridge began an ambitious program to repave their local streets in 1995. To date, all but six (6) streets have been replaced. These remaining streets received additional consideration in developing the master plan improvements.

The relative lack of water main breaks eliminates one important factor typically used to prioritize water main replacements. Therefore, replacement of Pleasant Ridge's aging water mains was prioritized based upon size, available fire flow, improved looping East of Woodward Avenue, streets scheduled for repaving in the next twenty (20) years and the importance placed on the pipe by the model.

Although all of the approximately 90+ year old mains should be replaced, a twenty year water distribution system CIP is recommended that will improve transmission and have the greatest impact on addressing the deficiencies in available fire flow identified in this study.

Over the next two decades, situations may arise which would prompt a review and/or change to this list. It should be noted that, overall, the current system is working well.

The following table provides the recommended 20 year capital improvement program. A map showing this program is included in Appendix J.

Years 1-5 – Interim Improvements				
CIP #	**Street Name**	**Project Limits**	**Length (ft)**	**Prop. Dia. (in)**
1	Additional SOCWA Supply	Eastbound 10 Mile at Oakdale	n/a	8
2	Gate Valve & Hydrant Insp./Exercise	City-wide	n/a	n/a
Continued on Next Page				

Years 6-20 – Master Plan Improvements				
CIP #	Street Name	Project Limits	Length (ft)	Prop. Dia. (in)
3	Ridge	10 Mile to South City Limit	2,525	8
4	Indiana	10 Mile to Woodward Heights	2,325	8
5	Bermuda	Sylvan to Woodward Heights	615	8
		Total Footage (Master Plan Improvements)	5,465	

Table 18- Proposed Master Plan Capital Improvement Program

Results

Future Maximum Day for Master Plan Improvements

The future model was run for the maximum day scenario to predict in general how well the distribution system will work and the available fire flow while maintaining 20 psi within the distribution system. System demand under the maximum day conditions was achieved by applying a global demand factor to the model. This increased the model's system-wide demand to match the future maximum day demand while maintaining the distribution that was applied as discussed previously. The simulation was performed using the SOCWA supply pressure at PR-01 as shown in Table 14 while the pressure at PR-02 was set at 62.65.

Based on the model's output (Appendix H), the water system, with all master plan improvement, generally works well during the future maximum day demand. Predicted pressures throughout the system generally ran between 58.05 and 69.95 psi, a slight increase from the 58.03 to 69.84 psi range predicted prior to the master plan improvements. Additionally, the model predicted significant improvement to available fire flow. The proposed variable minimum desired fire flows based on zoning are being met, city-wide, with the exception of a few dead end water mains where city limits prohibit reasonable looping solutions. Graphic depictions of pressures and available fire flow are also included in Appendix H. Note the model predicts the future maximum day demand will continue to be serviced almost equally between the two supplies with 46% of the flow through PR-01 and 54% of the flow through the new PR-02 under these conditions.

Sensitivity Analysis

A sensitivity analysis was performed to examine the future performance of the distribution system assuming all 6 inch water mains have been replaced with 8 inch diameter, all cast iron pipes have been replaced with ductile iron, and all pipes have a roughness ("C") factor of 90. The model was then run again for the future maximum day scenario to determine how these changes would impact the distribution system and the available fire flow while maintaining 20 psi within the system. The simulation was performed using the SOCWA supply pressure at PR-01 as shown in Table 14 while the pressure at PR-02 was set at 62.65.

Based on the model's output (Appendix I), the water system continues to generally work well during the future maximum day demand. Predicted pressures throughout the system generally ran between 58.17 and 70.41. No deficiencies in predicted available fire flow exist within the system under these conditions. Graphic depictions of pressures and available fire flow are also included in Appendix I. Note the model predicts the future maximum day demand will continue to be serviced almost equally between the two

supplies with 54% of the flow through PR-01 and 46% of the flow through the new PR-02 under these conditions.

Conclusion

Performance

The existing water distribution system generally works well during the average day scenario. Pressures throughout the system range between 57.21 and 69.89 psi with water supplied at the SOCWA connection as follows:

Meter	Location	Meter Elev. (ft)	Hydraulic Grade (ft)	Pressure (psi)
PR-01	Woodward and Oxford	648.0	802.77	67.0

Table 14 – SOCWA Supply at Connection Point

AEW is unaware of any complaints related to the service by Pleasant Ridge customers, further supporting the model predicted values. Ideal normal working pressures should not fall below 35 psi. Model analysis showed the system generally working well under maximum day conditions as well, with pressures throughout the system ranging between 52.55 and 68.44 psi, and under peak hour conditions, with pressures ranging between 44.61 and 67.07 psi.

However, when analyzing for available fire flow it is immediately apparent the majority of the distribution system cannot provide the desired flow of 1,000 gpm to residential areas. The area between Ridge Road and Woodward Avenue, from Oakland Park to the South City Limits, is the only area where the model predicts hydrants have the capability of delivering the recommended fire flow while maintaining 20 psi within the distribution system. As the model was analyzed for existing maximum day and peak hour demands, these deficiencies became more pronounced and the area capable of delivering the desired fire flow contracted.

The interim improvements proposed for construction showed marked improvement in system performance when added to the computer model and run under the current maximum day demand scenario. Predicted pressures throughout the system ranged from 58.05 to 69.92 psi, an increase from the 52.55 to 68.44 psi range without the improvements. Additionally, the available fire flow situation showed significant improvement. The model predicts almost all of Pleasant Ridge will be able to provide the desired flow of 1,000 gpm. Deficiencies in available fire flow remain in the southeastern corner of the City, primarily along the dead end water mains on Woodward Heights and Fairwood.

The distribution system, including the interim improvements, generally performed well when analyzed instantaneously under the future 2035 maximum day demand scenario. Predicted pressures throughout the system ranged from 58.03 to 69.84 psi, a slight drop attributed to further aging of the existing pipes. Additionally, the city-wide improvement with respect to available fire flow after the interim improvements generally remained despite the additional pipe aging and slight increase in demand. However, the

deficiencies in predicted available fire flows in the southeastern corner of the City also remain.

Finally, the distribution system, including all master plan proposed improvements, showed significant improvement in performance when analyzed under the future 2035 maximum day scenario. Predicted pressures ranged from 58.05 to 69.95 psi, a slight increase from the 58.03 to 69.84 psi range. Additionally, the model predicted significant improvement to available fire flow. The proposed variable minimum desired fire flows based on zoning are being met, city-wide, with the exception of a few dead end water mains where city limits prohibit reasonable looping solutions.

Benefits of the Capital Improvement Program Projects

As a whole, the interim and master plan Capital Improvement Program projects will improve available fire flow while maintaining a water distribution system that serves existing customers well. Independently, each of the CIP projects will provide immediate benefits to various portions of the water distribution system.

The potential benefits of each are summarized below:

CIP #1 <u>New SOCWA Supply at Eastbound 10 Mile Road and Oakdale</u>

This project will improve reliability and performance by replacing transitioning an emergency 12 inch emergency connection to SOCWA on Eastbound 10 Mile Road (I-696 Service Drive) at Oakdale (Gates on North and South side of I-696) into a second SOCWA supply connection in continuous use. Transition to continuous use will require construction of a meter vault and a pressure reduction valve to control the supply pressure and balance the flows with PR-01. This second supply point will increase static pressure in the Northern and Western portions of the City and greatly improve available fire flow city-wide.

Preliminary Estimate $1,411,590

CIP #2 <u>Gate Valve & Hydrant Inspection & Exercise Programs</u>

This project will improve reliability and function of the distribution system by ensuring the unimpeded flow of water throughout the distribution network through functioning gate valves and hydrants. It will also potentially limit the number of customers impacted by a temporary loss of service as additional gates would not need to be closed to perform any emergency repairs. Hydrant and valve repair and/or replacement would be scheduled annually based upon this programs results.

Negotiate service with Royal Oak DPS; Repairs/Replacements tbd

CIP #3 <u>Replace Ex. 10” CI with 8” DI on Ridge from 10 Mile Road to South City Limit</u>

This project will improve reliability and performance by replacing an existing 10 inch diameter cast iron water main that is estimated to be 95+ years old with a new 8 inch ductile iron water main. The new main will permit greater flow throughout the Western half of the City and greatly improve available fire flow in this area. Larger water mains were considered but the model predicted limited benefit.

Preliminary Estimate $572,495 (~2,525 FT)

CIP #4 New 8" DI on Indiana from 10 Mile Road to Woodward Heights
This project will improve reliability and performance by creating a second North-South water loop East of Woodward Avenue. Completion of this second loop will permit greater flow throughout the Eastern half of the City and improve available fire flow.
Preliminary Estimate $459,495 (~2,325 FT)

CIP #5 New 8" DI on Bermuda from Sylvan to Woodward Heights
This project will improve reliability and performance by creating a second North-South water loop between Sylvan and Woodward Heights. This reduces the length of dead end water mains on Fairwood and Woodward Heights by over 800 feet. Elimination of the dead ends on these streets is not feasible due to lack of a North-South Right-of-Way (ROW) along Pleasant Ridge's Eastern border with Ferndale on these blocks. Completion of this second loop will improve available fire flow in this area.
Preliminary Estimate $155,975 (~615 FT)

Recommendations
As previously referenced, Pleasant Ridge experiences relatively few water main breaks. The distribution system is relatively well looped and the community is fully developed. These factors have resulted in the absence of any "red flags" that would indicate a critical need and justified the community's hands off approach to the system. Although the water distribution system continues to operate well Pleasant Ridge should begin efforts to renew the aging infrastructure to prevent serious issues from developing.

Overall, the distribution system is well looped, which greatly enhances reliability. Looped mains reduce the impacted area and lessen the likelihood of prolonged water service interruption in the event of a water main break. However, there remain sporadic locations throughout the City where improved looping can improve reliability and available fire flow.

Pleasant Ridge should initiate efforts to replace water mains that have been in service for 95+ years and, at time of replacement, eliminate the existing 6 inch diameter water mains by installing 8 inch diameter water mains that will provide improved performance.

Note that fire-fighting demand can severely reduce pressures in a system of small diameter pipe. Undersized pipe results in excessive head loss and a corresponding decrease in flow, even when adequate pressures are maintained in larger, nearby mains. Industry standards recommend a minimum size pipe of 6 inch. However, many communities require a minimum 8 inch diameter for new pipe in residential zoning and a minimum 12 inch diameter for new pipe in multi-family, commercial and industrial zoning.

If current revenues are not sufficient to begin implementation of the recommended CIP projects, Pleasant Ridge should consider funding alternatives. Options to consider include a rate study to potentially incorporate/increase a replacement reserve into the water rate and application for a low interest loan through Michigan's Drinking Water Revolving Fund (DWRF).

Anderson, Eckstein and Westrick, Inc. recommends the following to maintain a safe, healthy and reliable public water distribution system:

- The Gate Valve and Hydrant Inspection and Exercise Program (CIP #2) should be implemented in 2016. Pleasant Ridge should inspect and exercise every gate valve and inspect and flush every hydrant in the City, and perform any repairs necessary (including replacement, if needed), to ensure they are fully operational within the next five (5) years. AEW recommends Pleasant Ridge establish five to ten "districts" and schedule 1 to 2 districts per year. This should be an annual program that is maintained perpetually after the initial inspections and repairs are completed. The schedule can be more aggressive if personnel and funding permits, but at minimum it is recommended that every valve and hydrant be inspected and exercised at least once every five years. (*)
- Initiate discussion with SOCWA related to transitioning the emergency connection at Eastbound 10 Mile Road and Oakdale into a second supply connection in continuous use (CIP#1). If SOCWA permits, this interim improvement would have the largest impact on improving available fire flow city-wide.
- Complete the three (3) projects identified as master plan improvements (CIP #3 – 5) within the next six (6) to twenty (20) years as the applicable street is repaved. (**)
- Continue and improve the methodical system of tracking detailed locations of water main breaks and repairs to identify and potentially re-prioritize aging water mains that should be retired and replaced. Existing pipe material and diameters should be noted during all repairs to improve the available "as-built" information about the distribution system.
- As a rule of thumb, aging water mains being retired should be replaced with a minimum 8 inch diameter pipe on all residential streets. The 10 inch to 12 inch transmission mains on Woodward Avenue and Oxford Boulevard are not proposed for replacement and the effects of a reduction in size has not yet been studied. If proposed due to reprioritizing, AEW can evaluate at that time.

(*) Staffing and budget issues, coupled with the size of the distribution system, may make programs to address <u>all</u> hydrants or valves annually unfeasible. At minimum, the system should be divided into districts such that annual programs address <u>all</u> hydrants and valves every five (5) years.

(**) Projects recommended for completion in years six (6) through twenty (20) may be reprioritized, and additional needs identified, based upon continued tracking of water main breaks.

The distribution system model created for this report is a valuable tool for future evaluation. Continued updates to the model are recommended as the distribution system is improved and as additional information becomes available. The information provided by future metered flows and hydrant flow tests will allow for continued refinement of the model's calibration and may assist with decision-making relative to identifying and prioritizing improvements.

APPENDIX A

Existing Water Distribution System; Map and Hydrant Flow Test Data

Includes:
Hydrant Flow Test Results
Existing Water Distribution System Map Panels

		1	2	3		4	5	6	7
	Hydrant No. 2 (FLOW)				Hydrant No. 1 (RESIDUAL)				
Test No.	Hydrant Location	Outlet Diameter [D] (IN)	Pitot Pressure [P] (PSI)	Discharge Coefficient [C]	Hydrant Location	Static Pressure [Ps] (PSI)	Residual Pressure [Pt] (PSI)	Flow at Hydrant No. 2 [Qf] (GPM)	Flow Available at Hyd No. 2 @ 20 PSI [Qr] (GPM)
1	8 Millington	3.75	5	0.9	22 Millington	56	7	840	700
2	4 Kenberton	3.75	2	0.9	14 Kenberton	59	17	530	500
	30 Oakland Park Ave	3.75			18 Oakland Park Ave	Aborted due to Hydrant Dated 7/12/1898			
3	139 Maplefield	3.75	4	0.9	103 Maplefield	59	12	760	700
4	111 Elm Park	3.75	2	0.9	125 Elm Park	57	17	530	500
5	24060 Woodward (@ Amherst)	3.75	12	0.9	23800 Woodward (@ Sylvan)	62	12	1310	1200
6	42 Fairwood	3.75	2	0.9	68 Fairwood	62	36	530	700
7	60 Amherst	3.75	1	0.9	88 Amherst	64	40	380	500
8	99 Kensington	3.75	2	0.9	55 Kensington	61	12	530	500

1 [D] - Measured

2 [P] - Measured at Hydrant No. 2 (Flowed Hydrant)

3 [C] - Based on Shape of Outlet: 0.9 = Smooth & Round, 0.8 = Sharp Edge, Square, 0.7 = Opening Projects into Hydrant

4 [Ps] - Measured at Hydrant No. 1 (Residual Hydrant, No Flow)

5 [Pt] - Measured at Hydrant No. 1 (Residual Hydrant, During Test)

6 [Qf] = 29.83 * C * D^2 * P^1/2

[Qf] = 29.83 * 3 * 1^2 * 2^1/2

7 [Qr] = Qf * {(Ps-Pr)/(Ps-Pt)}^0.54 where Pr = 20 psi

[Qr] = 6 * {(4-20)/(4-5)}^0.54

City of Huntington Woods

City of Royal Oak

City of Oak Park

I-696

I-696 SERVICE DR.

EMERGENCY CONNECTION TO SOCWA

MILLINGTON RD. (50')

WOODSIDE PARK BLVD. (80')

KENBERTON DR. (60')

KENBERTON DR. (50')

POPLAR PARK AVE. (100')

ELM PARK AVE. (50')

ELM PARK AVE. (100')

NORWICH RD. (50')

OAKLAND PARK (100')

MAHLEFELD RD (50')

OAKDALE BLVD. (76')

RIDGE RD. (50')

MAIN STREET

WOODWARD AVE. (M-1)

J-45 J-8 J-21 J-46 J-36 J-30 J-69 J-50 J-31 J-54 J-53 J-39 J-52 J-37 J-29 J-20 J-32 J-28 J-72 J-71 J-25 J-22 J-27 J-24 J-75 J-76 J-23

12" P-126 12" P-125 12" P-286 12" P-130 12" P-120 12" P-157 12" P-285 12" P-271 12" P-175 12" P-69 12" P-71

8" P-67 8" P-5 8" P-4 8" P-63 8" P-149

10" P-83 10" P-82 10" P-81 10" P-61 10" P-60 10" P-57 10" P-52

6" P-84 6" P-7 6" P-6 6" P-51 6" P-49 6" P-11 6" P-10 6" P-174

11-d-49 9-d-49 6-d-48 8-d-49

ANDERSON, ECKSTEIN AND WESTRICK, INC.
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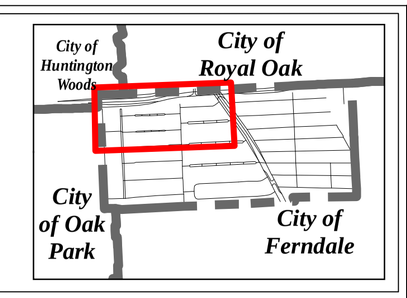
PLOT DATE: December 21, 2015	DRAWING DATE: December 17, 2015
PLOT SCALE: NTS	DRAWING SCALE: 24" x 36"
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHK'D BY: GIS DEPT

CITY OF PLEASANT RIDGE OAKLAND COUNTY MICHIGAN SEAL INCORPORATED 1928

- Intermediate Node
- Node
- Water Main

CITY of PLEASANT RIDGE

EXISTING WATER MAIN SYSTEM



PANEL NUMBER: **1**

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City of Royal Oak

City of Ferndale

I-696 SERVICE DR.

EMERGENCY CONNECTION TO FERNDALE

I-696

I-696 SERVICE DR.

MAIN STREET

EDWARD AVE. (M-1)

ELM PARK AVE. (100')

KENSINGTON BLVD. (60')

DEVONSHIRE RD. (60')

WELLESLEY DR. (60')

AMHERST RD. (60)

MAYWOOD AVE. (60')

INDIANA AVE.

EPRIZE DR. (50')

CANADIAN NATIONAL RAIL ROAD

GAINSBORO AVE.

GAINSBORO AVE.

J-54 J-53 J-39 J-52 J-37 J-32 J-33 J-41 J-55 J-38 J-77 J-43 J-84 J-34 J-6 J-83 J-5 J-40 J-82 J-81 J-42 J-44 J-35 J-47 J-48

12" P-157 12" P-271 12" P-175 10" P-92 12" P-69 6" P-84 12" P-71 12" P-172 12" P-171 12" P-170 8" P-149 6" P-174 12" P-285 6" P-156 6" P-21 6" P-13 6" P-87 6" P-155 6" P-97 6" P-154 6" P-103 6" P-18 6" P-178 6" P-107 6" P-205 10" P-189 12" P-264 12" P-148 6" P-152

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 59 61 63 67 69 71 73 75 77 79 81 83 85 87 93 95 97 99

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 50 52 54 56 60 66 68 70 72 76 78 82 84 88 90 92 98 100 102 104

A1 1 3 5 7 9 11A 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 51 55 57 59 61 65 67 69 71

4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 42 44 46 48 52 54 56 58 62 64 66 68 72 74

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85

6 8 10 12 14 16 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 88 90

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85

8 10 12 14 16 18 22 26 30 34 36 38 40 42 46 48 50 52 56 58 60 62 64 68 70 72 76 78 80 82 86 88 90 92

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67

6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70

24280 24242 24200 24126 24100 24060 24072 24028 24025

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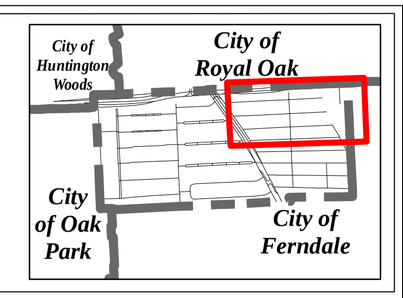
PLEASANT RIDGE CITY OAKLAND COUNTY MICHIGAN INCORPORATED 1928 SEAL

- Intermediate Node
- Node
- Water Main

CITY of PLEASANT RIDGE

EXISTING WATER MAIN SYSTEM



PANEL NUMBER: **2**

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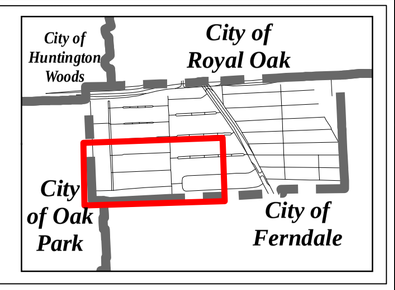
CITY OF PLEASANT RIDGE SEAL — INCORPORATED 1928 — OAKLAND COUNTY MICHIGAN

- Intermediate Node
- Node
- Water Main

CITY of PLEASANT RIDGE

EXISTING WATER MAIN SYSTEM



PANEL NUMBER: 3

CAUTION

THIS MAP IS INTENDED FOR REFERENCE PURPOSES ONLY.

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City of Ferndale

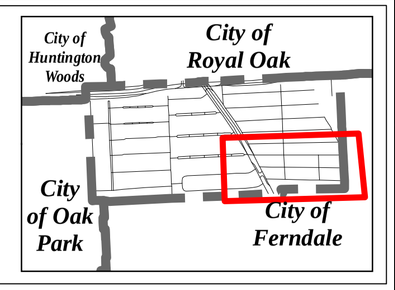
ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586-726-1234 Fax 586-726-8780

PLOT DATE: December 21, 2015	DRAWING DATE: December 17, 2015
PLOT SCALE: NTS	DRAWING SCALE: 24" x 36"
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHK'D BY: GIS DEPT

- Intermediate Node
- Node
- Water Main

CITY of PLEASANT RIDGE

EXISTING WATER MAIN SYSTEM



PANEL NUMBER: **4**

CAUTION

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APPENDIX B

Existing Water Distribution System; Calibration Results

Includes:
Computer Model Final Calibration Run

```
* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 7.022a  07/08/2015                              *
*  Serial #:  6-5116761                                     *
*  Interface:  Classic                                      *
*  Licensed for Pipe2014                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Sat Dec 05 14:54:37 2015

Master File : m:\0175\0175-0095\gen\reports\kypipe\import\watermodel2015.KYP\CalWiz.P2K

SUMMARY OF ORIGINAL DATA

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.14	130.0000	0.00
P-10	J-75	J-24	557.86	6.08	130.0000	1.27
P-103	J-38	J-82	1375.77	6.08	130.0000	1.54
P-107	J-43	J-44	2058.36	6.08	130.0000	1.37
P-11	J-76	J-75	402.54	6.08	130.0000	0.40
P-12	J-77	J-38	19.18	10.16	130.0000	0.17
P-120	J-31	J-36	972.64	12.34	120.0000	2.37
P-125	J-8	J-21	445.59	12.34	120.0000	0.70
P-126	J-45	J-8	160.81	12.34	120.0000	0.00
P-13	J-5	J-6	373.36	6.08	130.0000	0.00
P-130	J-36	J-46	1250.08	12.34	120.0000	1.79
P-14	J-78	J-61	266.57	10.16	130.0000	0.17
P-148	J-47	J-35	190.47	12.14	130.0000	0.17
P-149	J-27	J-33	1489.24	8.18	130.0000	2.98
P-15	J-79	J-80	597.22	6.08	130.0000	0.57
P-152	J-48	J-35	445.75	6.08	130.0000	0.57
P-154	J-42	J-40	362.71	6.08	130.0000	0.70
P-155	J-40	J-5	415.41	6.08	130.0000	1.27
P-156-XX	J-6	J-34	275.42	6.08	130.0000	0.17
P-157	J-53	J-54	124.93	12.14	130.0000	0.75
P-16	J-80	J-61	1275.42	6.08	130.0000	0.57
P-17	J-81	J-42	72.50	6.08	130.0000	0.17
P-170	J-33	J-55	209.02	12.14	130.0000	0.34
P-171	J-41	J-55	134.03	12.14	130.0000	0.00

P-172	J-37	J-41	362.21	12.14	130.0000	0.00
P-174	J-52	J-84	1394.38	6.08	130.0000	1.54
P-175	J-37	J-52	349.33	12.14	130.0000	0.69
P-178	J-44	J-42	304.86	6.08	130.0000	0.35
P-179	J-56	J-49	2164.85	6.08	130.0000	2.06
P-18	J-82	J-81	575.79	6.08	130.0000	0.57
P-188	J-26	J-1	1732.31	8.18	130.0000	1.89
P-189	J-43	J-77	250.49	10.16	130.0000	0.57
P-19	J-83	J-6	42.96	6.08	130.0000	0.17
P-191	J-14	J-51	1820.36	10.16	130.0000	2.81
P-192	J-59	J-60	171.60	10.16	130.0000	0.17
P-192a	J-60	J-68	67.12	10.16	130.0000	0.17
P-195	J-56	J-78	45.89	10.16	130.0000	0.40
P-197	J-56	J-43	304.88	10.16	130.0000	0.57
P-2	J-70	J-60	22.81	10.16	130.0000	0.00
P-20	J-7	J-73	152.54	8.18	130.0000	0.57
P-201	J-62	J-79	95.36	6.08	130.0000	0.57
P-209	J-13	J-63	324.39	10.16	130.0000	0.34
P-21	J-84	J-83	716.44	6.08	130.0000	0.40
P-210	J-59	J-13	198.02	10.16	130.0000	0.17
P-217	J-64	J-59	236.90	10.16	130.0000	0.17
P-219	J-64	J-65	1762.12	6.08	130.0000	1.49
P-221	J-61	J-64	294.29	10.16	130.0000	0.17
P-239	J-12	J-14	275.83	10.16	130.0000	0.17
P-24	J-9	J-7	245.04	8.18	130.0000	0.17
P-243	J-16	J-18	408.03	6.08	130.0000	0.17
P-25	J-10	J-11	270.51	6.08	130.0000	0.00
P-255	J-51	J-70	16.36	10.16	130.0000	0.00
P-264	J-34	J-35	559.29	12.14	130.0000	1.62
P-265	J-44	J-49	287.63	6.08	130.0000	0.17
P-266-XX	J-26	J-19	95.17	10.16	130.0000	0.00
P-268	J-3	PR-1	17.14	12.34	120.0000	0.00
P-269	J-51	J-3	30.19	10.16	130.0000	7.09
P-27	J-12	J-10	61.27	6.08	130.0000	0.17
P-271	J-52	J-53	156.58	12.14	130.0000	0.00
P-272	J-66	J-4	8.87	6.08	130.0000	0.17
P-275	J-1	J-4	9.76	12.14	130.0000	0.00
P-285	J-53	J-34	2026.54	12.14	130.0000	0.34
P-286	J-46	J-21	116.24	12.34	120.0000	0.87
P-29	J-13	J-14	2021.68	6.08	130.0000	2.52
P-3	J-4	J-70	436.95	12.14	130.0000	0.70
P-31	J-15	J-10	1335.13	6.08	130.0000	1.14
P-32	J-15	J-7	455.35	8.18	130.0000	1.84
P-34	J-16	J-15	416.64	6.08	130.0000	0.17
P-35	J-16	J-17	1343.13	6.08	130.0000	1.14
P-38	J-18	J-19	1348.06	6.08	130.0000	1.84
P-4	J-50	J-31	303.86	8.18	130.0000	0.52
P-41	J-20	J-21	168.80	6.08	130.0000	0.34
P-44	J-22	J-20	381.01	6.08	130.0000	0.17
P-46	J-23	J-22	387.52	6.08	130.0000	0.00
P-48	J-18	J-23	325.49	6.08	130.0000	0.57
P-49	J-23	J-76	391.70	6.08	130.0000	1.27
P-5	J-69	J-50	401.89	8.18	130.0000	0.40
P-51	J-25	J-71	454.23	6.08	130.0000	1.27
P-55	J-17	J-12	318.63	10.16	130.0000	0.00
P-56	J-26	J-17	306.82	10.16	130.0000	0.00
P-57	J-24	J-19	373.15	10.16	130.0000	0.00

P-58	J-27	J-24	43.67	10.16	130.0000	0.00
P-6	J-71	J-72	388.95	6.08	130.0000	0.40
P-60	J-25	J-27	300.24	10.16	130.0000	0.17
P-61	J-28	J-25	187.57	10.16	130.0000	0.00
P-63	J-29	J-20	1346.63	8.18	130.0000	1.14
P-67	J-30	J-69	223.04	8.18	130.0000	0.57
P-69	J-31	J-32	521.13	12.14	130.0000	0.00
P-7	J-72	J-22	509.45	6.08	130.0000	0.87
P-71	J-33	J-32	543.94	12.14	130.0000	0.00
P-8	J-73	J-74	479.27	8.18	130.0000	0.40
P-81	J-29	J-28	196.49	10.16	130.0000	0.17
P-82	J-30	J-29	151.25	10.16	130.0000	0.00
P-83	J-36	J-30	129.33	10.16	130.0000	0.00
P-84	J-32	J-28	1184.63	6.08	130.0000	1.14
P-87	J-5	J-37	2251.87	6.08	130.0000	2.51
P-9	J-74	J-8	1448.13	8.18	130.0000	2.94
P-92	J-38	J-39	1173.25	10.16	130.0000	0.87
P-97	J-40	J-41	2063.01	6.08	130.0000	2.34

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		2.07	646.90	
J-10		2.56	665.57	
J-11		0.21	666.78	
J-12		0.41	666.41	
J-13		3.39	650.77	
J-14		6.57	663.73	
J-15		3.94	660.87	
J-16		4.49	659.23	
J-17		3.11	663.22	
J-18		3.94	662.56	
J-19		2.35	668.34	
J-2		0.50	648.06	
J-20		2.21	657.89	
J-21		1.59	657.51	
J-22		2.35	658.30	
J-23		2.28	662.32	
J-24		0.83	664.89	
J-25		0.62	665.93	
J-26		2.28	666.12	
J-27		1.94	665.03	
J-28		1.59	665.85	
J-29		1.18	664.95	
J-3		0.00	648.42	
J-30		0.35	665.84	
J-31		0.28	642.05	
J-32		1.38	651.80	
J-33		1.73	649.84	
J-34		0.00	645.38	
J-35		0.44	640.76	
J-36		2.18	665.80	
J-37		5.07	650.49	
J-38		4.11	648.18	

J-39		0.00	655.00	
J-4		0.00	646.84	
J-40		5.74	641.08	
J-41		5.83	650.63	
J-42		0.21	642.94	
J-43		5.70	648.38	
J-44		4.63	640.70	
J-45		0.07	655.58	
J-46	EC-SOCWA	2.35	658.00	
J-47		0.00	641.36	
J-48		0.00	642.16	
J-49		4.43	643.24	
J-5		4.70	642.66	
J-50	1F	1.04	661.00	
J-51		3.18	648.00	
J-52		3.60	654.88	
J-53		0.00	655.33	
J-54		0.00	653.00	
J-55		0.00	650.63	
J-56		4.55	646.80	
J-59		0.40	649.53	
J-6		0.00	643.53	
J-60		0.00	648.00	
J-61		3.59	649.02	
J-62	EC-Ferndale	0.14	643.00	
J-63	EC-Ferndale	0.00	648.19	
J-64		5.16	647.71	
J-65		4.73	642.19	
J-66		0.00	646.83	
J-68		0.00	648.00	
J-69	1R	1.11	663.00	
J-7		1.66	658.64	
J-70		0.00	648.00	
J-71	2F	0.97	665.00	
J-72	2R	1.24	662.00	
J-73	3F	1.59	657.00	
J-74	3R	4.56	654.00	
J-75	4F	1.31	663.00	
J-76	4R	1.24	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	1.66	641.00	
J-8		3.66	654.08	
J-80	6F	4.36	648.00	
J-81	7R	1.87	641.00	
J-82	7F	5.05	640.00	
J-83	8F	2.42	642.00	
J-84	8R	6.02	644.00	
J-9		0.55	659.92	
PR-1	PR-1	----	648.00	802.77

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

Case: 0

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 1)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

TANK at node PR-1 has a new HGL of 802.770
Case: 0

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 2)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

TANK at node PR-1 has a new HGL of 798.150
Case: 0

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 3)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

TANK at node PR-1 has a new HGL of 800.460
Case: 0

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 4)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

TANK at node PR-1 has a new HGL of 798.150
Case: 0

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 5)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

TANK at node PR-1 has a new HGL of 795.840
Case: 0

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 6)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

TANK at node PR-1 has a new HGL of 793.530

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 99
NUMBER OF END NODES .....(J) = 81
NUMBER OF PRIMARY LOOPS .....(L) = 18
NUMBER OF SUPPLY NODES .....(F) = 1
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	0.50	0.00	0.00	0.00	0.00	0.00
P-10	J-75	J-24	1.84	0.00	0.00	0.02	0.00	0.00
P-103	J-38	J-82	18.67	0.06	0.00	0.21	0.04	0.04
P-107	J-43	J-44	15.13	0.06	0.00	0.17	0.03	0.03
P-11	J-76	J-75	3.15	0.00	0.00	0.03	0.00	0.00
P-12	J-77	J-38	22.78	0.00	0.00	0.09	0.01	0.01
P-120	J-31	J-36	-3.12	0.00	0.00	0.01	0.00	0.00
P-125	J-8	J-21	14.39	0.00	0.00	0.04	0.00	0.00
P-126	J-45	J-8	-0.07	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	8.22	0.00	0.00	0.09	0.01	0.01
P-130	J-36	J-46	-7.59	0.00	0.00	0.02	0.00	0.00
P-14	J-78	J-61	-63.01	0.01	0.00	0.25	0.03	0.03
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	1.25	0.00	0.00	0.01	0.00	0.00
P-15	J-79	J-80	-1.80	0.00	0.00	0.02	0.00	0.00
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	32.46	0.04	0.00	0.36	0.13	0.12
P-155	J-40	J-5	17.56	0.02	0.00	0.19	0.04	0.04
P-156-XX	J-6	J-34						
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-61	-6.15	0.01	0.00	0.07	0.01	0.01
P-17	J-81	J-42	11.75	0.00	0.00	0.13	0.02	0.02
P-170	J-33	J-55	1.35	0.00	0.00	0.00	0.00	0.00
P-171	J-41	J-55	-1.35	0.00	0.00	0.00	0.00	0.00
P-172	J-37	J-41	-4.68	0.00	0.00	0.01	0.00	0.00
P-174	J-52	J-84	0.22	0.00	0.00	0.00	0.00	0.00
P-175	J-37	J-52	4.25	0.00	0.00	0.01	0.00	0.00
P-178	J-44	J-42	20.91	0.02	0.00	0.23	0.05	0.05
P-179	J-56	J-49	14.85	0.06	0.00	0.16	0.03	0.03
P-18	J-82	J-81	13.62	0.01	0.00	0.15	0.02	0.02
P-188	J-26	J-1	-24.53	0.03	0.00	0.15	0.02	0.02
P-189	J-43	J-77	22.78	0.00	0.00	0.09	0.01	0.01
P-19	J-83	J-6	-8.22	0.00	0.00	0.09	0.01	0.01
P-191	J-14	J-51	-41.73	0.03	0.00	0.17	0.02	0.02
P-192	J-59	J-60	-93.27	0.01	0.00	0.37	0.07	0.07
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-63.01	0.00	0.00	0.25	0.04	0.03
P-197	J-56	J-43	43.61	0.01	0.00	0.17	0.02	0.02
P-2	J-70	J-60	93.27	0.00	0.00	0.37	0.07	0.07
P-20	J-7	J-73	24.28	0.00	0.00	0.15	0.02	0.02
P-201	J-62	J-79	-0.14	0.00	0.00	0.00	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	-5.80	0.00	0.00	0.06	0.01	0.01
P-210	J-59	J-13	10.23	0.00	0.00	0.04	0.00	0.00
P-217	J-64	J-59	-82.64	0.01	0.00	0.33	0.06	0.06
P-219	J-64	J-65	4.73	0.01	0.00	0.05	0.00	0.00
P-221	J-61	J-64	-72.75	0.01	0.00	0.29	0.05	0.04
P-239	J-12	J-14	-42.00	0.00	0.00	0.17	0.02	0.02
P-24	J-9	J-7	-0.55	0.00	0.00	0.00	0.00	0.00
P-243	J-16	J-18	23.02	0.03	0.00	0.25	0.06	0.06
P-25	J-10	J-11	0.21	0.00	0.00	0.00	0.00	0.00

P-255	J-51	J-70	120.37	0.00	0.00	0.48	0.11	0.11
P-264	J-34	J-35	0.44	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	-10.42	0.00	0.00	0.12	0.01	0.01
P-266-XX	J-26	J-19						
P-268	J-3	PR-1	-165.27	0.00	0.00	0.44	0.09	0.09
P-269	J-51	J-3	-165.27	0.01	0.05	0.65	1.76	0.20
P-27	J-12	J-10	31.39	0.01	0.00	0.35	0.12	0.11
P-271	J-52	J-53	0.44	0.00	0.00	0.00	0.00	0.00
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-27.10	0.00	0.00	0.08	0.00	0.00
P-285	J-53	J-34	0.44	0.00	0.00	0.00	0.00	0.00
P-286	J-46	J-21	-9.94	0.00	0.00	0.03	0.00	0.00
P-29	J-13	J-14	6.84	0.01	0.00	0.08	0.01	0.01
P-3	J-4	J-70	-27.10	0.00	0.00	0.08	0.00	0.00
P-31	J-15	J-10	-28.63	0.13	0.00	0.32	0.10	0.10
P-32	J-15	J-7	26.49	0.01	0.00	0.16	0.02	0.02
P-34	J-16	J-15	1.81	0.00	0.00	0.02	0.00	0.00
P-35	J-16	J-17	-29.32	0.14	0.00	0.32	0.10	0.10
P-38	J-18	J-19	6.69	0.01	0.00	0.07	0.01	0.01
P-4	J-50	J-31	-0.18	0.00	0.00	0.00	0.00	0.00
P-41	J-20	J-21	-2.86	0.00	0.00	0.03	0.00	0.00
P-44	J-22	J-20	1.41	0.00	0.00	0.02	0.00	0.00
P-46	J-23	J-22	5.71	0.00	0.00	0.06	0.00	0.00
P-48	J-18	J-23	12.39	0.01	0.00	0.14	0.02	0.02
P-49	J-23	J-76	4.40	0.00	0.00	0.05	0.00	0.00
P-5	J-69	J-50	0.86	0.00	0.00	0.01	0.00	0.00
P-51	J-25	J-71	0.27	0.00	0.00	0.00	0.00	0.00
P-55	J-17	J-12	-10.19	0.00	0.00	0.04	0.00	0.00
P-56	J-26	J-17	22.24	0.00	0.00	0.09	0.00	0.00
P-57	J-24	J-19	-4.34	0.00	0.00	0.02	0.00	0.00
P-58	J-27	J-24	-5.35	0.00	0.00	0.02	0.00	0.00
P-6	J-71	J-72	-0.70	0.00	0.00	0.01	0.00	0.00
P-60	J-25	J-27	-2.16	0.00	0.00	0.01	0.00	0.00
P-61	J-28	J-25	-1.27	0.00	0.00	0.01	0.00	0.00
P-63	J-29	J-20	-2.06	0.00	0.00	0.01	0.00	0.00
P-67	J-30	J-69	1.96	0.00	0.00	0.01	0.00	0.00
P-69	J-31	J-32	2.66	0.00	0.00	0.01	0.00	0.00
P-7	J-72	J-22	-1.94	0.00	0.00	0.02	0.00	0.00
P-71	J-33	J-32	-1.83	0.00	0.00	0.01	0.00	0.00
P-8	J-73	J-74	22.69	0.01	0.00	0.14	0.02	0.01
P-81	J-29	J-28	0.87	0.00	0.00	0.00	0.00	0.00
P-82	J-30	J-29	-0.01	0.00	0.00	0.00	0.00	0.00
P-83	J-36	J-30	2.30	0.00	0.00	0.01	0.00	0.00
P-84	J-32	J-28	-0.55	0.00	0.00	0.01	0.00	0.00
P-87	J-5	J-37	4.64	0.01	0.00	0.05	0.00	0.00
P-9	J-74	J-8	18.13	0.01	0.00	0.11	0.01	0.01
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-41	9.16	0.02	0.00	0.10	0.01	0.01

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		2.07	793.47	646.90	146.57	63.51
J-10		2.56	793.43	665.57	127.86	55.41

J-11		0.21	793.43	666.78	126.65	54.88
J-12		0.41	793.44	666.41	127.03	55.05
J-13		3.39	793.46	650.77	142.69	61.83
J-14		6.57	793.45	663.73	129.72	56.21
J-15		3.94	793.30	660.87	132.44	57.39
J-16		4.49	793.30	659.23	134.07	58.10
J-17		3.11	793.44	663.22	130.22	56.43
J-18		3.94	793.28	662.56	130.71	56.64
J-19		2.35	793.27	668.34	124.93	54.14
J-2		0.50	793.47	648.06	145.42	63.01
J-20		2.21	793.27	657.89	135.37	58.66
J-21		1.59	793.27	657.51	135.76	58.83
J-22		2.35	793.27	658.30	134.97	58.49
J-23		2.28	793.27	662.32	130.95	56.74
J-24		0.83	793.27	664.89	128.38	55.63
J-25		0.62	793.27	665.93	127.33	55.18
J-26		2.28	793.44	666.12	127.33	55.17
J-27		1.94	793.27	665.03	128.24	55.57
J-28		1.59	793.27	665.85	127.42	55.21
J-29		1.18	793.27	664.95	128.32	55.61
J-3		0.00	793.53	648.42	145.10	62.88
J-30		0.35	793.27	665.84	127.42	55.22
J-31		0.28	793.27	642.05	151.22	65.53
J-32		1.38	793.27	651.80	141.46	61.30
J-33		1.73	793.27	649.84	143.43	62.15
J-34		0.00	793.27	645.38	147.89	64.08
J-35		0.44	793.27	640.76	152.50	66.08
J-36		2.18	793.27	665.80	127.47	55.24
J-37		5.07	793.27	650.49	142.77	61.87
J-38		4.11	793.41	648.18	145.24	62.94
J-39		0.00	793.41	655.00	138.41	59.98
J-4		0.00	793.47	646.84	146.63	63.54
J-40		5.74	793.29	641.08	152.21	65.96
J-41		5.83	793.27	650.63	142.64	61.81
J-42		0.21	793.34	642.94	150.40	65.17
J-43		5.70	793.42	648.38	145.04	62.85
J-44		4.63	793.35	640.70	152.66	66.15
J-45		0.07	793.27	655.58	137.69	59.67
J-46	EC-SOCWA	2.35	793.27	658.00	135.27	58.62
J-47		0.00	793.27	641.36	151.90	65.82
J-48		0.00	793.27	642.16	151.11	65.48
J-49		4.43	793.36	643.24	150.11	65.05
J-5		4.70	793.28	642.66	150.61	65.27
J-50	1F	1.04	793.27	661.00	132.27	57.32
J-51		3.18	793.48	648.00	145.48	63.04
J-52		3.60	793.27	654.88	138.38	59.97
J-53		0.00	793.27	655.33	137.94	59.77
J-54		0.00	793.27	653.00	140.27	60.78
J-55		0.00	793.27	650.63	142.64	61.81
J-56		4.55	793.42	646.80	146.62	63.54
J-59		0.40	793.46	649.53	143.93	62.37
J-6		0.00	793.27	643.53	149.74	64.89
J-60		0.00	793.47	648.00	145.47	63.04
J-61		3.59	793.43	649.02	144.41	62.58
J-62	EC-Ferndale	0.14	793.42	643.00	150.42	65.18
J-63	EC-Ferndale	0.00	793.46	648.19	145.27	62.95
J-64		5.16	793.45	647.71	145.73	63.15

J-65		4.73	793.44	642.19	151.25	65.54
J-66		0.00	793.47	646.83	146.64	63.54
J-68		0.00	793.47	648.00	145.47	63.04
J-69	1R	1.11	793.27	663.00	130.27	56.45
J-7		1.66	793.29	658.64	134.65	58.35
J-70		0.00	793.47	648.00	145.47	63.04
J-71	2F	0.97	793.27	665.00	128.27	55.58
J-72	2R	1.24	793.27	662.00	131.27	56.88
J-73	3F	1.59	793.29	657.00	136.29	59.06
J-74	3R	4.56	793.28	654.00	139.28	60.36
J-75	4F	1.31	793.27	663.00	130.27	56.45
J-76	4R	1.24	793.27	661.00	132.27	57.32
J-77	5F	0.00	793.41	648.00	145.41	63.01
J-78	5R	0.00	793.42	647.00	146.42	63.45
J-79	6R	1.66	793.42	641.00	152.42	66.05
J-8		3.66	793.27	654.08	139.19	60.32
J-80	6F	4.36	793.43	648.00	145.43	63.02
J-81	7R	1.87	793.34	641.00	152.34	66.01
J-82	7F	5.05	793.35	640.00	153.35	66.45
J-83	8F	2.42	793.27	642.00	151.27	65.55
J-84	8R	6.02	793.27	644.00	149.27	64.68
J-9		0.55	793.29	659.92	133.37	57.79
PR-1	PR-1	----	793.53	648.00	145.53	63.06

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-82	66.45	J-19	54.14
J-44	66.15	J-11	54.88
J-35	66.08	J-12	55.05
J-79	66.05	J-26	55.17
J-81	66.01	J-25	55.18

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	0.65	P-82	0.00
P-255	0.48	P-126	0.00
P-268	0.44	P-4	0.00
P-192	0.37	P-264	0.00
P-2	0.37	P-271	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	1.76	P-82	0.00

P-154	0.13	P-126	0.00
P-27	0.12	P-271	0.00
P-255	0.11	P-285	0.00
P-35	0.10	P-264	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	0.20	P-82	0.00
P-154	0.12	P-126	0.00
P-27	0.11	P-271	0.00
P-255	0.11	P-264	0.00
P-35	0.10	P-285	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
PR-1	165.27	PR-1

NET SYSTEM INFLOW = 165.27
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 165.27

==========

Calibration Data
SUMMARY OF CALIBRATION DATA :

Number of fire-flow test cases = 6

Summary of Decision Variables:

Age factors are adjusted for 5 group(s):
The corresponding Bounds are:

Group Number	Upper Bound	Lower Bound
1	3.000	0.500
2	3.000	0.500
3	3.000	0.500
4	3.000	0.500
5	3.000	0.500

Demands of the Following Types are adjusted

Demand Type	Percent Tolerance

Type-1	5.000

Junction (Fire) Flows are Adjusted for Each Change

Change	Percent Tolerance
1	15.00
2	15.00
3	15.00
4	15.00
5	15.00
6	15.00

Fireflow data:

Change	Node	Measured Flow
1	J-50	840.000
2	J-73	760.000
3	J-75	530.000
4	J-77	1310.000
5	J-82	380.000
6	J-83	530.000

==========

Design Results

SUMMARY OF DESIGN RESULTS:

Percent Deviation between MEASURED and TARGET Values = 7.870

OPTIMAL values for the Decision variables:

Age Factor for group number 1 is 2.9194 [3.0000< > 0.5000]
Age Factor for group number 2 is 2.3548 [3.0000< > 0.5000]
Age Factor for group number 3 is 2.9194 [3.0000< > 0.5000]
Age Factor for group number 4 is 2.8387 [3.0000< > 0.5000]
Age Factor for group number 5 is 1.7903 [3.0000< > 0.5000]

zdmd: 1 -0.368209094 0.00000000E+00 1.03709674
No demand adjustments are made.
Demand Tolerance is meant for re-distributing
demands among nodes of diff demand types, keeping
the total demand constant. There must be at least
TWO types of demands to use this feature.

Junction (Fire) Flow(s) for Change 1 are INCREASED by 3.71%
Junction (Fire) Flow(s) for Change 2 are DECREASED by 15.00%
Junction (Fire) Flow(s) for Change 3 are DECREASED by 3.39%
Junction (Fire) Flow(s) for Change 4 are DECREASED by 1.45%
Junction (Fire) Flow(s) for Change 5 are INCREASED by 15.00%
Junction (Fire) Flow(s) for Change 6 are INCREASED by 14.03%

Measured and Target pressures (psi or kPa):

TEST CASE	NODE NUMBER	MEASURED PRESSURE	OPTIMAL PRESSURE
1	J-69	7.0	5.8
2	J-74	12.0	7.2
3	J-76	17.0	16.3
4	J-78	12.0	13.5
5	J-81	40.0	50.1
6	J-83	12.0	11.4

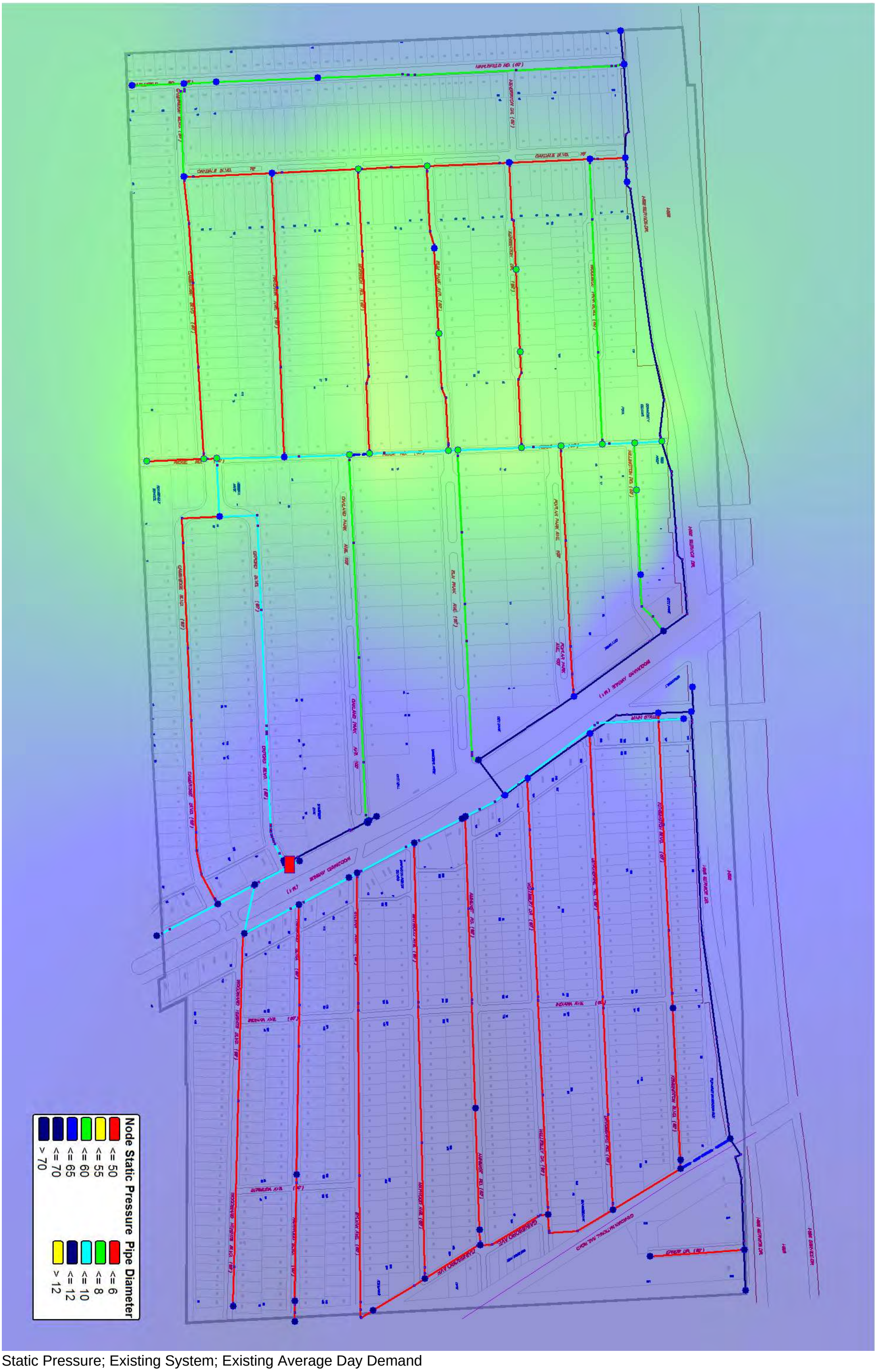
Date & Time: Sat Dec 05 14:54:41 2015

------- NETWORK CALIBRATION COMPLETED --------

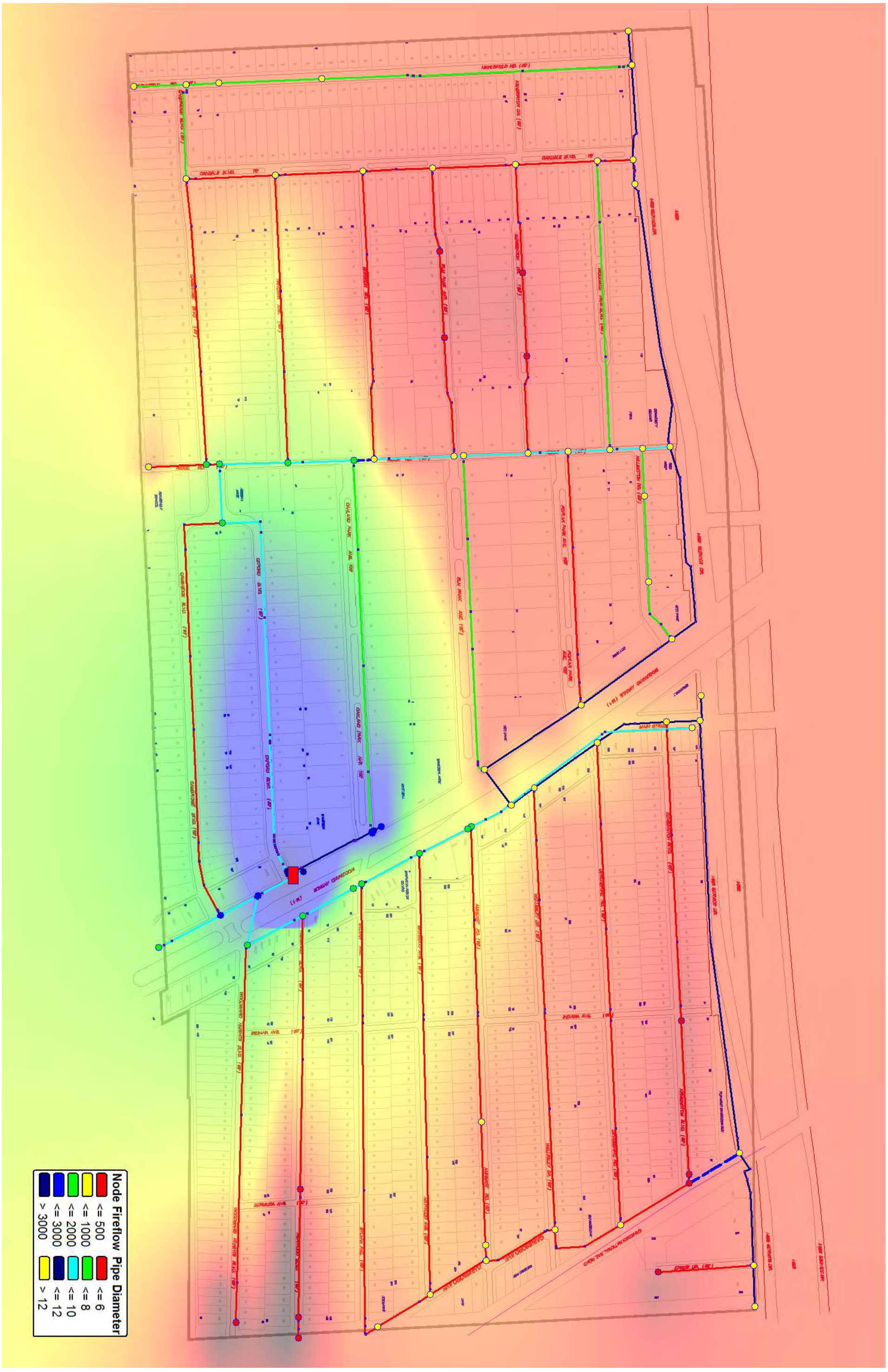
APPENDIX C

Existing Water Distribution System; Existing Average Day Demand Results

Includes:
Static Pressure Gradient Map; Existing System, Existing Average Day Demand
Available Fire Flow Gradient Map; Existing System, Existing Average Day Demand
Computer Model Simulation; Existing System, Existing Average Day Demand



Static Pressure; Existing System; Existing Average Day Demand



Available Fire Flow; Existing System; Existing Average Day Demand

```
* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 7.022a  07/08/2015                              *
*  Serial #:  6-5116761                                     *
*  Interface:  Classic                                      *
*  Licensed for Pipe2014                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 Date & Time:  Wed Jan 13 09:17:56 2016

 Master File : m:\0175\0175-0095\gen\reports\kypipe\import\socwa
revision\watermodel2015.KYP\watermodel2015.P2K
```

SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.14	36.7943	0.00
P-10	J-75	J-24	557.86	6.08	34.1458	1.27
P-103	J-38	J-82	1375.77	6.08	34.1458	1.54
P-107	J-43	J-44	2058.36	6.08	34.1458	1.37
P-11	J-76	J-75	402.54	6.08	34.1458	0.40
P-12	J-77	J-38	19.18	10.16	34.1458	0.17
P-120	J-31	J-36	972.64	12.34	80.3947	2.37
P-125	J-8	J-21	445.59	12.34	80.3947	0.70
P-126	J-45	J-8	160.81	12.34	80.3947	0.00
P-13	J-5	J-6	373.36	6.08	34.1458	0.00
P-130	J-36	J-46	1250.08	12.34	80.3947	1.79
P-14	J-78	J-61	266.57	10.16	34.1458	0.17
P-148	J-47	J-35	190.47	12.14	36.7943	0.17
P-149	J-27	J-33	1489.24	8.18	52.6812	2.98
P-15	J-79	J-80	597.22	6.08	34.1458	0.57
P-152	J-48	J-35	445.75	6.08	34.1458	0.57
P-154	J-42	J-40	362.71	6.08	34.1458	0.70
P-155	J-40	J-5	415.41	6.08	34.1458	1.27
P-156-XX	J-6	J-34	275.42	6.08	34.1458	0.17
P-157	J-53	J-54	124.93	12.14	36.7943	0.75
P-16	J-80	J-61	1275.42	6.08	34.1458	0.57
P-17	J-81	J-42	72.50	6.08	34.1458	0.17
P-170	J-33	J-55	209.02	12.14	36.7943	0.34

P-171	J-41	J-55	134.03	12.14	36.7943	0.00
P-172	J-37	J-41	362.21	12.14	36.7943	0.00
P-174	J-52	J-84	1394.38	6.08	34.1458	1.54
P-175	J-37	J-52	349.33	12.14	36.7943	0.69
P-178	J-44	J-42	304.86	6.08	34.1458	0.35
P-179	J-56	J-49	2164.85	6.08	34.1458	2.06
P-18	J-82	J-81	575.79	6.08	34.1458	0.57
P-188	J-26	J-1	1732.31	8.18	52.6812	1.89
P-189	J-43	J-77	250.49	10.16	34.1458	0.57
P-19	J-83	J-6	42.96	6.08	34.1458	0.17
P-191	J-14	J-51	1820.36	10.16	34.1458	2.81
P-192	J-59	J-60	171.60	10.16	34.1458	0.17
P-192a	J-60	J-68	67.12	10.16	34.1458	0.17
P-195	J-56	J-78	45.89	10.16	34.1458	0.40
P-197	J-56	J-43	304.88	10.16	34.1458	0.57
P-2	J-70	J-60	22.81	10.16	34.1458	0.00
P-20	J-7	J-73	152.54	8.18	52.6812	0.57
P-201	J-62	J-79	95.36	6.08	34.1458	0.57
P-209	J-13	J-63	324.39	10.16	34.1458	0.34
P-21	J-84	J-83	716.44	6.08	34.1458	0.40
P-210	J-59	J-13	198.02	10.16	34.1458	0.17
P-217	J-64	J-59	236.90	10.16	34.1458	0.17
P-219	J-64	J-65	1762.12	6.08	34.1458	1.49
P-221	J-61	J-64	294.29	10.16	34.1458	0.17
P-239	J-12	J-14	275.83	10.16	34.1458	0.17
P-24	J-9	J-7	245.04	8.18	52.6812	0.17
P-243	J-16	J-18	408.03	6.08	34.1458	0.17
P-25	J-10	J-11	270.51	6.08	34.1458	0.00
P-255	J-51	J-70	16.36	10.16	34.1458	0.00
P-264	J-34	J-35	559.29	12.14	36.7943	1.62
P-265	J-44	J-49	287.63	6.08	34.1458	0.17
P-266-XX	J-26	J-19	95.17	10.16	34.1458	0.00
P-268	J-3	PR-1	17.14	12.34	95.9564	0.00
P-269	J-51	J-3	30.19	10.16	34.1458	7.09
P-27	J-12	J-10	61.27	6.08	34.1458	0.17
P-271	J-52	J-53	156.58	12.14	36.7943	0.00
P-272	J-66	J-4	8.87	6.08	34.1458	0.17
P-275	J-1	J-4	9.76	12.14	36.7943	0.00
P-285	J-53	J-34	2026.54	12.14	36.7943	0.34
P-286	J-46	J-21	116.24	12.34	80.3947	0.87
P-29	J-13	J-14	2021.68	6.08	34.1458	2.52
P-3	J-4	J-70	436.95	12.14	36.7943	0.70
P-31	J-15	J-10	1335.13	6.08	34.1458	1.14
P-32	J-15	J-7	455.35	8.18	52.6812	1.84
P-34	J-16	J-15	416.64	6.08	34.1458	0.17
P-35	J-16	J-17	1343.13	6.08	34.1458	1.14
P-38	J-18	J-19	1348.06	6.08	34.1458	1.84
P-4	J-50	J-31	303.86	8.18	52.6812	0.52
P-41	J-20	J-21	168.80	6.08	34.1458	0.34
P-44	J-22	J-20	381.01	6.08	34.1458	0.17
P-46	J-23	J-22	387.52	6.08	34.1458	0.00
P-48	J-18	J-23	325.49	6.08	34.1458	0.57
P-49	J-23	J-76	391.70	6.08	34.1458	1.27
P-5	J-69	J-50	401.89	8.18	52.6812	0.40
P-51	J-25	J-71	454.23	6.08	34.1458	1.27
P-55	J-17	J-12	318.63	10.16	34.1458	0.00
P-56	J-26	J-17	306.82	10.16	34.1458	0.00

P-57	J-24	J-19	373.15	10.16	34.1458	0.00
P-58	J-27	J-24	43.67	10.16	34.1458	0.00
P-6	J-71	J-72	388.95	6.08	34.1458	0.40
P-60	J-25	J-27	300.24	10.16	34.1458	0.17
P-61	J-28	J-25	187.57	10.16	34.1458	0.00
P-63	J-29	J-20	1346.63	8.18	52.6812	1.14
P-67	J-30	J-69	223.04	8.18	52.6812	0.57
P-69	J-31	J-32	521.13	12.14	36.7943	0.00
P-7	J-72	J-22	509.45	6.08	34.1458	0.87
P-71	J-33	J-32	543.94	12.14	36.7943	0.00
P-8	J-73	J-74	479.27	8.18	52.6812	0.40
P-81	J-29	J-28	196.49	10.16	34.1458	0.17
P-82	J-30	J-29	151.25	10.16	34.1458	0.00
P-83	J-36	J-30	129.33	10.16	34.1458	0.00
P-84	J-32	J-28	1184.63	6.08	34.1458	1.14
P-87	J-5	J-37	2251.87	6.08	34.1458	2.51
P-9	J-74	J-8	1448.13	8.18	52.6812	2.94
P-92	J-38	J-39	1173.25	10.16	34.1458	0.87
P-97	J-40	J-41	2063.01	6.08	34.1458	2.34

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		2.07	646.90	
J-10		2.56	665.57	
J-11		0.21	666.78	
J-12		0.41	666.41	
J-13		3.39	650.77	
J-14		6.57	663.73	
J-15		3.94	660.87	
J-16		4.49	659.23	
J-17		3.11	663.22	
J-18		3.94	662.56	
J-19		2.35	668.34	
J-2		0.50	648.06	
J-20		2.21	657.89	
J-21		1.59	657.51	
J-22		2.35	658.30	
J-23		2.28	662.32	
J-24		0.83	664.89	
J-25		0.62	665.93	
J-26		2.28	666.12	
J-27		1.94	665.03	
J-28		1.59	665.85	
J-29		1.18	664.95	
J-3		0.00	648.42	
J-30		0.35	665.84	
J-31		0.28	642.05	
J-32		1.38	651.80	
J-33		1.73	649.84	
J-34		0.00	645.38	
J-35		0.44	640.76	
J-36		2.18	665.80	
J-37		5.07	650.49	

J-38		4.11	648.18	
J-39		0.00	655.00	
J-4		0.00	646.84	
J-40		5.74	641.08	
J-41		5.83	650.63	
J-42		0.21	642.94	
J-43		5.70	648.38	
J-44		4.63	640.70	
J-45		0.07	655.58	
J-46	EC-SOCWA	2.35	658.00	
J-47	EC-Ferndale	0.00	641.36	
J-48		0.00	642.16	
J-49		4.43	643.24	
J-5		4.70	642.66	
J-50	1F	1.04	661.00	
J-51		3.18	648.00	
J-52		3.60	654.88	
J-53		0.00	655.33	
J-54		0.00	653.00	
J-55		0.00	650.63	
J-56		4.55	646.80	
J-59		0.40	649.53	
J-6		0.00	643.53	
J-60		0.00	648.00	
J-61		3.59	649.02	
J-62	EC-Ferndale	0.14	643.00	
J-63	EC-Ferndale	0.00	648.19	
J-64		5.16	647.71	
J-65		4.73	642.19	
J-66		0.00	646.83	
J-68		0.00	648.00	
J-69	1R	1.11	663.00	
J-7		1.66	658.64	
J-70		0.00	648.00	
J-71	2F	0.97	665.00	
J-72	2R	1.24	662.00	
J-73	3F	1.59	657.00	
J-74	3R	4.56	654.00	
J-75	4F	1.31	663.00	
J-76	4R	1.24	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	1.66	641.00	
J-8		3.66	654.08	
J-80	6F	4.36	648.00	
J-81	7R	1.87	641.00	
J-82	7F	5.05	640.00	
J-83	8F	2.42	642.00	
J-84	8R	6.02	644.00	
J-9		0.55	659.92	
PR-1	PR-1	----	648.00	802.77

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5

MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 99
NUMBER OF END NODES .....(J) = 81
NUMBER OF PRIMARY LOOPS .....(L) = 18
NUMBER OF SUPPLY NODES .....(F) = 1
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 11 TRIALS: ACCURACY = 0.54309E-03

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

Existing System; Existing Average Day Demand

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	0.50	0.00	0.00	0.00	0.00	0.00
P-10	J-75	J-24	0.92	0.00	0.00	0.01	0.00	0.00
P-103	J-38	J-82	18.21	0.68	0.00	0.20	0.50	0.50
P-107	J-43	J-44	14.72	0.69	0.00	0.16	0.33	0.33
P-11	J-76	J-75	2.23	0.00	0.00	0.02	0.01	0.01
P-12	J-77	J-38	22.31	0.00	0.00	0.09	0.06	0.06
P-120	J-31	J-36	-5.92	0.00	0.00	0.02	0.00	0.00
P-125	J-8	J-21	19.41	0.00	0.00	0.05	0.00	0.00
P-126	J-45	J-8	-0.07	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	7.80	0.04	0.00	0.09	0.10	0.10
P-130	J-36	J-46	-12.68	0.00	0.00	0.03	0.00	0.00
P-14	J-78	J-61	-61.75	0.10	0.00	0.24	0.39	0.39
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	0.99	0.00	0.00	0.01	0.00	0.00
P-15	J-79	J-80	-1.80	0.00	0.00	0.02	0.01	0.01
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	31.21	0.49	0.00	0.34	1.35	1.35
P-155	J-40	J-5	16.84	0.18	0.00	0.19	0.43	0.43
P-156-XX	J-6	J-34						
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-61	-6.15	0.08	0.00	0.07	0.07	0.07
P-17	J-81	J-42	11.29	0.01	0.00	0.12	0.21	0.20
P-170	J-33	J-55	2.60	0.00	0.00	0.01	0.00	0.00
P-171	J-41	J-55	-2.60	0.00	0.00	0.01	0.00	0.00
P-172	J-37	J-41	-5.40	0.00	0.00	0.01	0.00	0.00
P-174	J-52	J-84	0.63	0.00	0.00	0.01	0.00	0.00
P-175	J-37	J-52	4.67	0.00	0.00	0.01	0.00	0.00
P-178	J-44	J-42	20.12	0.18	0.00	0.22	0.60	0.60
P-179	J-56	J-49	14.46	0.70	0.00	0.16	0.32	0.32
P-18	J-82	J-81	13.16	0.16	0.00	0.15	0.27	0.27

P-188	J-26	J-1	-31.44	0.25	0.00	0.19	0.14	0.14
P-189	J-43	J-77	22.31	0.01	0.00	0.09	0.06	0.06
P-19	J-83	J-6	-7.80	0.00	0.00	0.09	0.10	0.10
P-191	J-14	J-51	-37.55	0.28	0.00	0.15	0.16	0.16
P-192	J-59	J-60	-90.53	0.14	0.00	0.36	0.80	0.79
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-61.75	0.02	0.00	0.24	0.40	0.39
P-197	J-56	J-43	42.73	0.06	0.00	0.17	0.20	0.20
P-2	J-70	J-60	90.53	0.02	0.00	0.36	0.79	0.79
P-20	J-7	J-73	29.29	0.02	0.00	0.18	0.13	0.13
P-201	J-62	J-79	-0.14	0.00	0.00	0.00	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	-5.38	0.04	0.00	0.06	0.05	0.05
P-210	J-59	J-13	8.74	0.00	0.00	0.03	0.01	0.01
P-217	J-64	J-59	-81.39	0.15	0.00	0.32	0.65	0.65
P-219	J-64	J-65	4.73	0.07	0.00	0.05	0.04	0.04
P-221	J-61	J-64	-71.50	0.15	0.00	0.28	0.51	0.51
P-239	J-12	J-14	-36.34	0.04	0.00	0.14	0.15	0.15
P-24	J-9	J-7	-0.55	0.00	0.00	0.00	0.00	0.00
P-243	J-16	J-18	19.26	0.22	0.00	0.21	0.55	0.55
P-25	J-10	J-11	0.21	0.00	0.00	0.00	0.00	0.00
P-255	J-51	J-70	124.54	0.02	0.00	0.49	1.43	1.43
P-264	J-34	J-35	0.44	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	-10.04	0.05	0.00	0.11	0.16	0.16
P-266-XX	J-26	J-19						
P-268	J-3	PR-1	-165.28	0.00	0.00	0.44	0.14	0.14
P-269	J-51	J-3	-165.28	0.07	0.05	0.65	3.98	2.42
P-27	J-12	J-10	32.12	0.09	0.00	0.35	1.42	1.42
P-271	J-52	J-53	0.44	0.00	0.00	0.00	0.00	0.00
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-34.01	0.00	0.00	0.09	0.05	0.05
P-285	J-53	J-34	0.44	0.00	0.00	0.00	0.00	0.00
P-286	J-46	J-21	-15.03	0.00	0.00	0.04	0.00	0.00
P-29	J-13	J-14	5.35	0.10	0.00	0.06	0.05	0.05
P-3	J-4	J-70	-34.01	0.02	0.00	0.09	0.05	0.05
P-31	J-15	J-10	-29.36	1.60	0.00	0.32	1.20	1.20
P-32	J-15	J-7	31.51	0.07	0.00	0.19	0.15	0.14
P-34	J-16	J-15	6.09	0.03	0.00	0.07	0.07	0.07
P-35	J-16	J-17	-29.84	1.66	0.00	0.33	1.24	1.24
P-38	J-18	J-19	5.27	0.07	0.00	0.06	0.05	0.05
P-4	J-50	J-31	-1.01	0.00	0.00	0.01	0.00	0.00
P-41	J-20	J-21	-2.78	0.00	0.00	0.03	0.02	0.02
P-44	J-22	J-20	0.60	0.00	0.00	0.01	0.00	0.00
P-46	J-23	J-22	4.28	0.01	0.00	0.05	0.03	0.03
P-48	J-18	J-23	10.04	0.05	0.00	0.11	0.17	0.16
P-49	J-23	J-76	3.48	0.01	0.00	0.04	0.02	0.02
P-5	J-69	J-50	0.02	0.00	0.00	0.00	0.00	0.00
P-51	J-25	J-71	0.89	0.00	0.00	0.01	0.00	0.00
P-55	J-17	J-12	-3.80	0.00	0.00	0.02	0.00	0.00
P-56	J-26	J-17	29.16	0.03	0.00	0.12	0.10	0.10
P-57	J-24	J-19	-2.92	0.00	0.00	0.01	0.00	0.00
P-58	J-27	J-24	-3.01	0.00	0.00	0.01	0.00	0.00
P-6	J-71	J-72	-0.08	0.00	0.00	0.00	0.00	0.00
P-60	J-25	J-27	-0.09	0.00	0.00	0.00	0.00	0.00
P-61	J-28	J-25	1.42	0.00	0.00	0.01	0.00	0.00
P-63	J-29	J-20	-1.17	0.00	0.00	0.01	0.00	0.00
P-67	J-30	J-69	1.13	0.00	0.00	0.01	0.00	0.00

P-69	J-31	J-32	4.63	0.00	0.00	0.01	0.00	0.00
P-7	J-72	J-22	-1.33	0.00	0.00	0.01	0.00	0.00
P-71	J-33	J-32	-3.34	0.00	0.00	0.01	0.00	0.00
P-8	J-73	J-74	27.70	0.05	0.00	0.17	0.11	0.11
P-81	J-29	J-28	3.11	0.00	0.00	0.01	0.00	0.00
P-82	J-30	J-29	3.11	0.00	0.00	0.01	0.00	0.00
P-83	J-36	J-30	4.59	0.00	0.00	0.02	0.00	0.00
P-84	J-32	J-28	-0.10	0.00	0.00	0.00	0.00	0.00
P-87	J-5	J-37	4.34	0.08	0.00	0.05	0.03	0.03
P-9	J-74	J-8	23.14	0.12	0.00	0.14	0.08	0.08
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-41	8.63	0.26	0.00	0.10	0.12	0.12

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		2.07	802.60	646.90	155.70	67.47
J-10		2.56	802.24	665.57	136.66	59.22
J-11		0.21	802.24	666.78	135.45	58.70
J-12		0.41	802.32	666.41	135.91	58.90
J-13		3.39	802.47	650.77	151.70	65.74
J-14		6.57	802.36	663.73	138.63	60.07
J-15		3.94	800.63	660.87	139.76	60.56
J-16		4.49	800.66	659.23	141.43	61.29
J-17		3.11	802.32	663.22	139.11	60.28
J-18		3.94	800.43	662.56	137.87	59.74
J-19		2.35	800.37	668.34	132.03	57.21
J-2		0.50	802.60	648.06	154.55	66.97
J-20		2.21	800.37	657.89	142.47	61.74
J-21		1.59	800.37	657.51	142.86	61.91
J-22		2.35	800.37	658.30	142.07	61.56
J-23		2.28	800.38	662.32	138.05	59.82
J-24		0.83	800.36	664.89	135.47	58.71
J-25		0.62	800.36	665.93	134.43	58.25
J-26		2.28	802.35	666.12	136.24	59.04
J-27		1.94	800.36	665.03	135.34	58.65
J-28		1.59	800.36	665.85	134.51	58.29
J-29		1.18	800.36	664.95	135.42	58.68
J-3		0.00	802.77	648.42	154.34	66.88
J-30		0.35	800.37	665.84	134.52	58.29
J-31		0.28	800.37	642.05	158.31	68.60
J-32		1.38	800.36	651.80	148.56	64.38
J-33		1.73	800.36	649.84	150.53	65.23
J-34		0.00	800.36	645.38	154.98	67.16
J-35		0.44	800.36	640.76	159.60	69.16
J-36		2.18	800.37	665.80	134.57	58.31
J-37		5.07	800.36	650.49	149.87	64.94
J-38		4.11	801.96	648.18	153.79	66.64
J-39		0.00	801.96	655.00	146.96	63.68
J-4		0.00	802.60	646.84	155.76	67.50
J-40		5.74	800.62	641.08	159.54	69.14
J-41		5.83	800.36	650.63	149.74	64.89
J-42		0.21	801.11	642.94	158.17	68.54
J-43		5.70	801.98	648.38	153.60	66.56

J-44		4.63	801.29	640.70	160.60	69.59
J-45		0.07	800.37	655.58	144.79	62.74
J-46	EC-SOCWA	2.35	800.37	658.00	142.37	61.69
J-47	EC-Ferndale	0.00	800.36	641.36	159.00	68.90
J-48		0.00	800.36	642.16	158.20	68.55
J-49		4.43	801.34	643.24	158.10	68.51
J-5		4.70	800.44	642.66	157.78	68.37
J-50	1F	1.04	800.37	661.00	139.37	60.39
J-51		3.18	802.65	648.00	154.65	67.01
J-52		3.60	800.36	654.88	145.48	63.04
J-53		0.00	800.36	655.33	145.04	62.85
J-54		0.00	800.36	653.00	147.36	63.86
J-55		0.00	800.36	650.63	149.74	64.89
J-56		4.55	802.04	646.80	155.24	67.27
J-59		0.40	802.47	649.53	152.94	66.27
J-6		0.00	800.40	643.53	156.87	67.98
J-60		0.00	802.61	648.00	154.61	67.00
J-61		3.59	802.16	649.02	153.14	66.36
J-62	EC-Ferndale	0.14	802.08	643.00	159.08	68.93
J-63	EC-Ferndale	0.00	802.47	648.19	154.28	66.85
J-64		5.16	802.32	647.71	154.60	67.00
J-65		4.73	802.24	642.19	160.05	69.36
J-66		0.00	802.60	646.83	155.77	67.50
J-68		0.00	802.61	648.00	154.61	67.00
J-69	1R	1.11	800.37	663.00	137.37	59.52
J-7		1.66	800.56	658.64	141.92	61.50
J-70		0.00	802.62	648.00	154.62	67.00
J-71	2F	0.97	800.36	665.00	135.36	58.66
J-72	2R	1.24	800.36	662.00	138.36	59.96
J-73	3F	1.59	800.54	657.00	143.54	62.20
J-74	3R	4.56	800.49	654.00	146.49	63.48
J-75	4F	1.31	800.37	663.00	137.37	59.53
J-76	4R	1.24	800.37	661.00	139.37	60.39
J-77	5F	0.00	801.97	648.00	153.97	66.72
J-78	5R	0.00	802.06	647.00	155.06	67.19
J-79	6R	1.66	802.08	641.00	161.08	69.80
J-8		3.66	800.37	654.08	146.29	63.39
J-80	6F	4.36	802.08	648.00	154.08	66.77
J-81	7R	1.87	801.12	641.00	160.12	69.39
J-82	7F	5.05	801.28	640.00	161.28	69.89
J-83	8F	2.42	800.40	642.00	158.40	68.64
J-84	8R	6.02	800.36	644.00	156.36	67.76
J-9		0.55	800.56	659.92	140.64	60.94
PR-1	PR-1	----	802.77	648.00	154.77	67.07

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-82	69.89	J-19	57.21
J-79	69.80	J-25	58.25
J-44	69.59	J-28	58.29
J-81	69.39	J-30	58.29
J-65	69.36	J-36	58.31

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	0.65	P-5	0.00
P-255	0.49	P-126	0.00
P-268	0.44	P-60	0.00
P-192	0.36	P-6	0.00
P-2	0.36	P-84	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	3.98	P-126	0.00
P-255	1.43	P-5	0.00
P-27	1.42	P-60	0.00
P-154	1.35	P-271	0.00
P-35	1.24	P-285	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	2.42	P-126	0.00
P-255	1.43	P-5	0.00
P-27	1.42	P-60	0.00
P-154	1.35	P-264	0.00
P-35	1.24	P-271	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
PR-1	165.28	PR-1

NET SYSTEM INFLOW = 165.28
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 165.27

==========

FireFlow/Hydrant Report
Fireflow/Hydrant Report:

Specified Minimum Pressure(psi or kPa): 20.0
Minimum Static Pressure(psi or kPa) : 20.0
Sp.Min Pres@FirePump Suctn(psi or kPa): 0.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2
Flow-3: Flowrate to maintain the specified pressure at Fire Pump Suction
(Flow-3 is based on combined value of hydrant and hose constants)

Hose Constant = 0.00

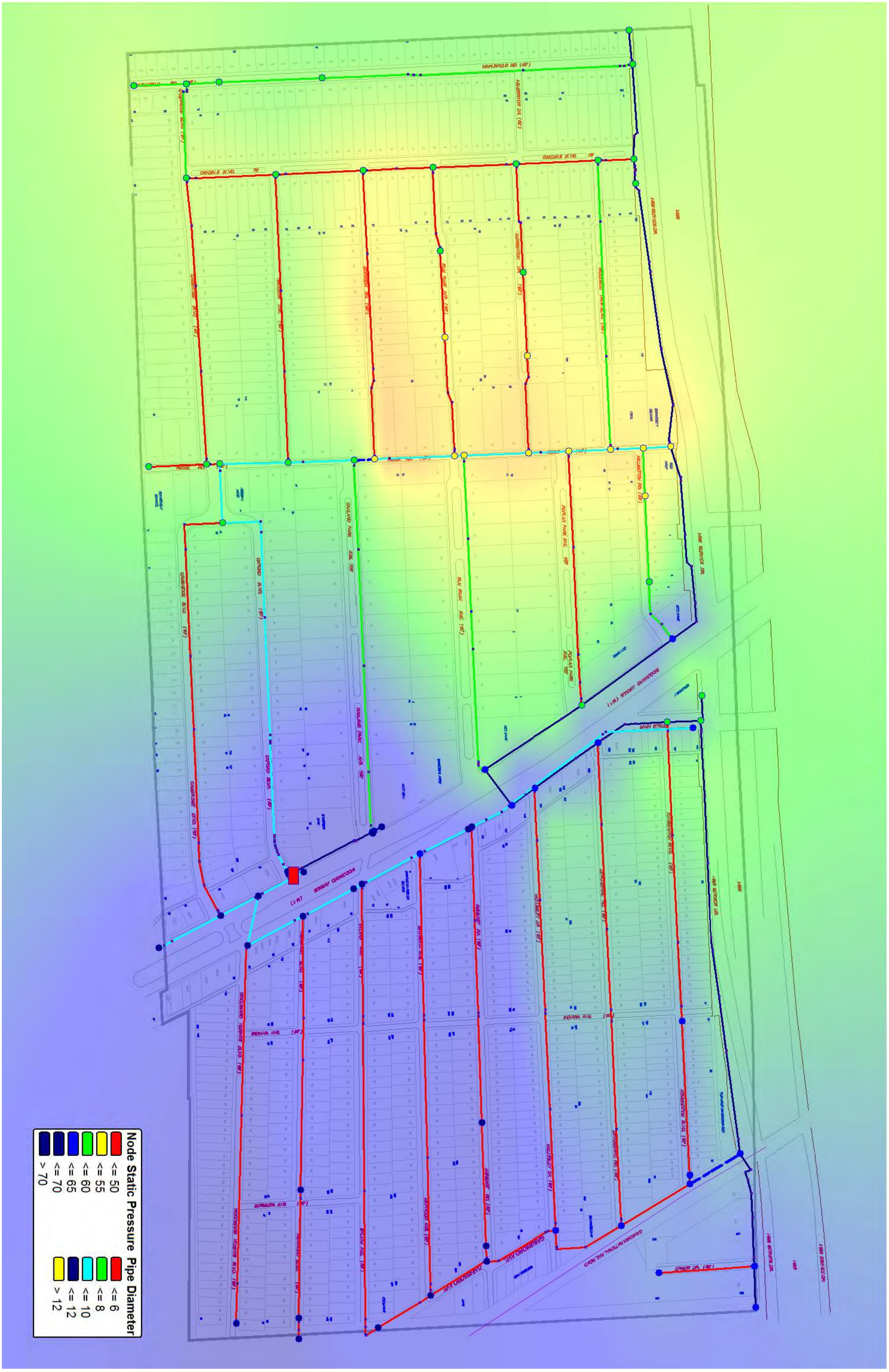
Hydrant Node	Hydrant Constant	Elevation	Demand gpm	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2
J-1	0.0	646.9	2.1	67.5	3066.3	3048.7	J-2
J-10	0.0	665.6	2.6	59.2	1094.4	1086.1	J-11
J-11	0.0	666.8	0.2	58.7	512.8		
J-12	0.0	666.4	0.4	58.9	1569.5		
J-13	0.0	650.8	3.4	65.7	2073.4		
J-14	0.0	663.7	6.6	60.1	1648.0		
J-15	0.0	660.9	3.9	60.6	625.6		
J-16	0.0	659.2	4.5	61.3	618.3		
J-17	0.0	663.2	3.1	60.3	1555.2		
J-18	0.0	662.6	3.9	59.7	546.1		
J-19	0.0	668.3	2.4	57.2	544.2		
J-2	0.0	648.1	0.5	67.0	2934.9		
J-20	0.0	657.9	2.2	61.7	589.8	585.3	J-19
J-21	0.0	657.5	1.6	61.9	621.6	587.0	J-19
J-22	0.0	658.3	2.4	61.6	537.0		
J-23	0.0	662.3	2.3	59.8	526.2		
J-24	0.0	664.9	0.8	58.7	577.6	564.7	J-19
J-25	0.0	665.9	0.6	58.3	578.1	574.2	J-19
J-26	0.0	666.1	2.3	59.0	1479.5		
J-27	0.0	665.0	1.9	58.6	580.2	568.0	J-19
J-28	0.0	665.9	1.6	58.3	581.9	579.1	J-19
J-29	0.0	664.9	1.2	58.7	588.4	582.2	J-19
J-3	0.0	648.4	0.0	66.9	54004.8	47652.3	J-19
J-30	0.0	665.8	0.3	58.3	585.8	583.2	J-19
J-31	0.0	642.1	0.3	68.6	677.7	583.6	J-19
J-32	0.0	651.8	1.4	64.4	641.3	584.3	J-19
J-33	0.0	649.8	1.7	65.2	649.9	586.8	J-19
J-34	0.0	645.4	0.0	67.2	573.4		
J-35	0.0	640.8	0.4	69.2	572.6	568.5	J-48
J-36	0.0	665.8	2.2	58.3	589.9	585.9	J-19
J-37	0.0	650.5	5.1	64.9	641.6	595.2	J-19
J-38	0.0	648.2	4.1	66.6	1106.0	1065.8	J-39
J-39	0.0	655.0	0.0	63.7	745.7		
J-4	0.0	646.8	0.0	67.5	3083.4	3065.6	J-2
J-40	0.0	641.1	5.7	69.1	662.0		
J-41	0.0	650.6	5.8	64.9	648.6	593.8	J-19
J-42	0.0	642.9	0.2	68.5	738.0		
J-43	0.0	648.4	5.7	66.6	1216.8	1175.1	J-39
J-44	0.0	640.7	4.6	69.6	718.4		
J-45	0.0	655.6	0.1	62.7	625.5	586.2	J-19
J-46	0.0	658.0	2.4	61.7	620.4	587.6	J-19
J-47	0.0	641.4	0.0	68.9	565.5		

J-48	0.0	642.2	0.0	68.6	367.3		
J-49	0.0	643.2	4.4	68.5	592.1		
J-5	0.0	642.7	4.7	68.4	558.0		
J-50	0.0	661.0	1.0	60.4	592.8	584.4	J-19
J-51	0.0	648.0	3.2	67.0	5524.7	4875.9	J-19
J-52	0.0	654.9	3.6	63.0	614.5	594.8	J-19
J-53	0.0	655.3	0.0	62.8	603.5	591.2	J-19
J-54	0.0	653.0	0.0	63.9	607.4	591.2	J-19
J-55	0.0	650.6	0.0	64.9	643.7	586.9	J-19
J-56	0.0	646.8	4.6	67.3	1379.5	1323.5	J-39
J-59	0.0	649.5	0.4	66.3	2746.9	2688.1	J-39
J-6	0.0	643.5	0.0	68.0	463.2		
J-60	0.0	648.0	0.0	67.0	4367.3	4074.7	J-19
J-61	0.0	649.0	3.6	66.4	1590.0	1549.4	J-39
J-62	0.0	643.0	0.1	68.9	226.9		
J-63	0.0	648.2	0.0	66.9	1516.7		
J-64	0.0	647.7	5.2	67.0	2004.4	1944.6	J-39
J-65	0.0	642.2	4.7	69.4	248.1		
J-66	0.0	646.8	0.0	67.5	2415.2		
J-68	0.0	648.0	0.0	67.0	3325.6		
J-69	0.0	663.0	1.1	59.5	586.7	584.3	J-19
J-7	0.0	658.6	1.7	61.5	618.0	613.1	J-9
J-70	0.0	648.0	0.0	67.0	4942.5	4413.9	J-19
J-71	0.0	665.0	1.0	58.7	443.9		
J-72	0.0	662.0	1.2	60.0	442.8		
J-73	0.0	657.0	1.6	62.2	620.9	618.0	J-9
J-74	0.0	654.0	4.6	63.5	628.4	626.5	J-19
J-75	0.0	663.0	1.3	59.5	443.6		
J-76	0.0	661.0	1.2	60.4	453.0		
J-77	0.0	648.0	0.0	66.7	1109.8	1068.4	J-39
J-78	0.0	647.0	0.0	67.2	1401.3	1346.4	J-39
J-79	0.0	641.0	1.7	69.8	236.6	234.4	J-62
J-8	0.0	654.1	3.7	63.4	636.2	589.8	J-19
J-80	0.0	648.0	4.4	66.8	281.1		
J-81	0.0	641.0	1.9	69.4	701.0		
J-82	0.0	640.0	5.0	69.9	573.1		
J-83	0.0	642.0	2.4	68.6	463.6		
J-84	0.0	644.0	6.0	67.8	423.1		
J-9	0.0	659.9	0.6	60.9	581.0		

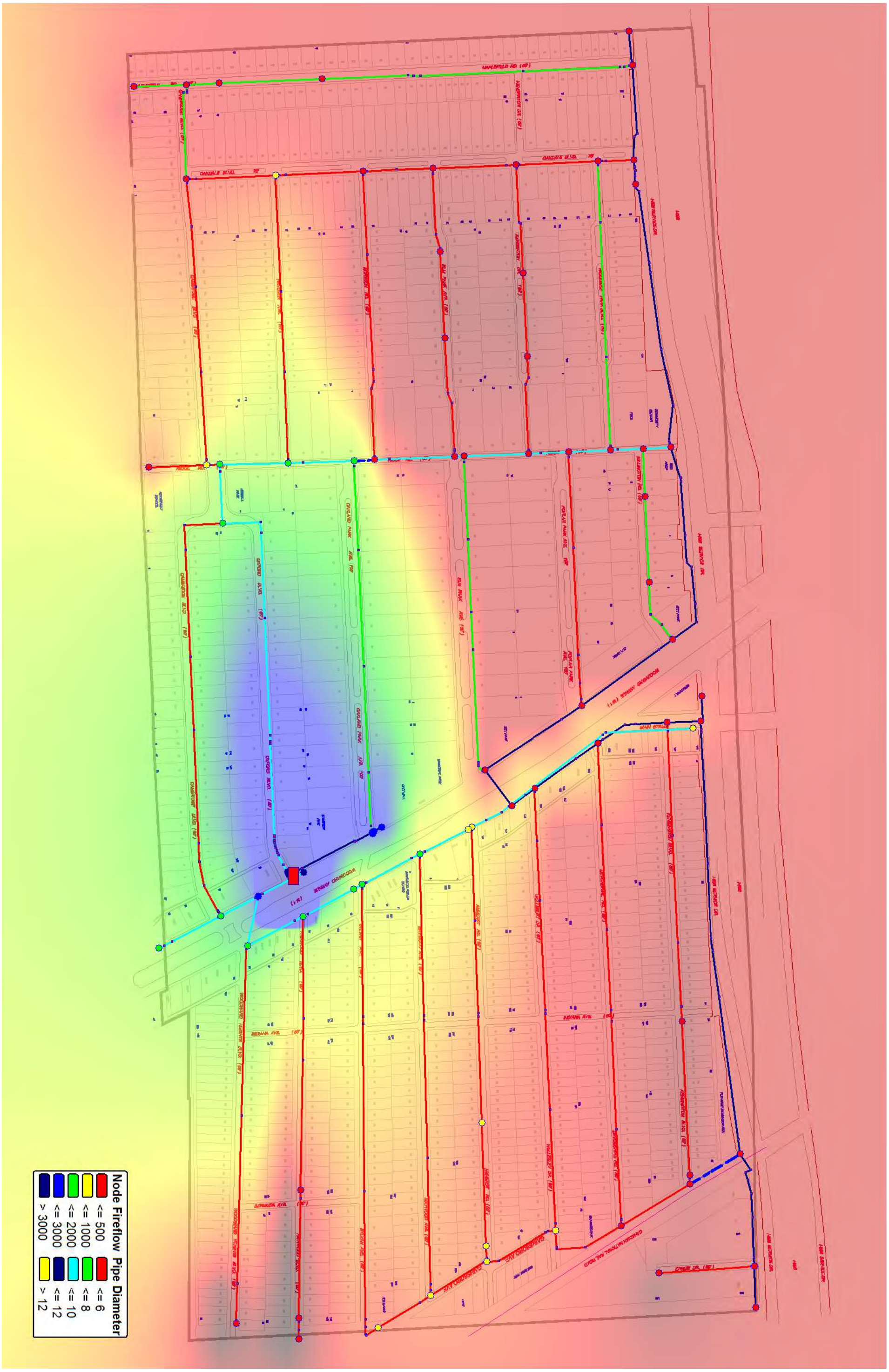
APPENDIX D

Existing Water Distribution System; Existing Maximum Day Demand Results

Includes:
Static Pressure Gradient Map; Existing System, Existing Maximum Day Demand
Available Fire Flow Gradient Map; Existing System, Existing Maximum Day Demand
Computer Model Simulation; Existing System, Existing Maximum Day Demand



Static Pressure; Existing System; Existing Maximum Day Demand



Available Fire Flow; Existing System; Existing Maximum Day Demand

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 7.022a  07/08/2015                              *
*  Serial #:  6-5116761                                     *
*  Interface:  Classic                                      *
*  Licensed for Pipe2014                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 Date & Time:  Wed Jan 13 09:28:22 2016

 Master File : m:\0175\0175-0095\gen\reports\kypipe\import\socwa
revision\watermodel2015.KYP\watermodel2015.P2K
```

SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.14	36.7943	0.00
P-10	J-75	J-24	557.86	6.08	34.1458	1.27
P-103	J-38	J-82	1375.77	6.08	34.1458	1.54
P-107	J-43	J-44	2058.36	6.08	34.1458	1.37
P-11	J-76	J-75	402.54	6.08	34.1458	0.40
P-12	J-77	J-38	19.18	10.16	34.1458	0.17
P-120	J-31	J-36	972.64	12.34	80.3947	2.37
P-125	J-8	J-21	445.59	12.34	80.3947	0.70
P-126	J-45	J-8	160.81	12.34	80.3947	0.00
P-13	J-5	J-6	373.36	6.08	34.1458	0.00
P-130	J-36	J-46	1250.08	12.34	80.3947	1.79
P-14	J-78	J-61	266.57	10.16	34.1458	0.17
P-148	J-47	J-35	190.47	12.14	36.7943	0.17
P-149	J-27	J-33	1489.24	8.18	52.6812	2.98
P-15	J-79	J-80	597.22	6.08	34.1458	0.57
P-152	J-48	J-35	445.75	6.08	34.1458	0.57
P-154	J-42	J-40	362.71	6.08	34.1458	0.70
P-155	J-40	J-5	415.41	6.08	34.1458	1.27
P-156-XX	J-6	J-34	275.42	6.08	34.1458	0.17
P-157	J-53	J-54	124.93	12.14	36.7943	0.75
P-16	J-80	J-61	1275.42	6.08	34.1458	0.57
P-17	J-81	J-42	72.50	6.08	34.1458	0.17
P-170	J-33	J-55	209.02	12.14	36.7943	0.34

P-171	J-41	J-55	134.03	12.14	36.7943	0.00
P-172	J-37	J-41	362.21	12.14	36.7943	0.00
P-174	J-52	J-84	1394.38	6.08	34.1458	1.54
P-175	J-37	J-52	349.33	12.14	36.7943	0.69
P-178	J-44	J-42	304.86	6.08	34.1458	0.35
P-179	J-56	J-49	2164.85	6.08	34.1458	2.06
P-18	J-82	J-81	575.79	6.08	34.1458	0.57
P-188	J-26	J-1	1732.31	8.18	52.6812	1.89
P-189	J-43	J-77	250.49	10.16	34.1458	0.57
P-19	J-83	J-6	42.96	6.08	34.1458	0.17
P-191	J-14	J-51	1820.36	10.16	34.1458	2.81
P-192	J-59	J-60	171.60	10.16	34.1458	0.17
P-192a	J-60	J-68	67.12	10.16	34.1458	0.17
P-195	J-56	J-78	45.89	10.16	34.1458	0.40
P-197	J-56	J-43	304.88	10.16	34.1458	0.57
P-2	J-70	J-60	22.81	10.16	34.1458	0.00
P-20	J-7	J-73	152.54	8.18	52.6812	0.57
P-201	J-62	J-79	95.36	6.08	34.1458	0.57
P-209	J-13	J-63	324.39	10.16	34.1458	0.34
P-21	J-84	J-83	716.44	6.08	34.1458	0.40
P-210	J-59	J-13	198.02	10.16	34.1458	0.17
P-217	J-64	J-59	236.90	10.16	34.1458	0.17
P-219	J-64	J-65	1762.12	6.08	34.1458	1.49
P-221	J-61	J-64	294.29	10.16	34.1458	0.17
P-239	J-12	J-14	275.83	10.16	34.1458	0.17
P-24	J-9	J-7	245.04	8.18	52.6812	0.17
P-243	J-16	J-18	408.03	6.08	34.1458	0.17
P-25	J-10	J-11	270.51	6.08	34.1458	0.00
P-255	J-51	J-70	16.36	10.16	34.1458	0.00
P-264	J-34	J-35	559.29	12.14	36.7943	1.62
P-265	J-44	J-49	287.63	6.08	34.1458	0.17
P-266-XX	J-26	J-19	95.17	10.16	34.1458	0.00
P-268	J-3	PR-1	17.14	12.34	95.9564	0.00
P-269	J-51	J-3	30.19	10.16	34.1458	7.09
P-27	J-12	J-10	61.27	6.08	34.1458	0.17
P-271	J-52	J-53	156.58	12.14	36.7943	0.00
P-272	J-66	J-4	8.87	6.08	34.1458	0.17
P-275	J-1	J-4	9.76	12.14	36.7943	0.00
P-285	J-53	J-34	2026.54	12.14	36.7943	0.34
P-286	J-46	J-21	116.24	12.34	80.3947	0.87
P-29	J-13	J-14	2021.68	6.08	34.1458	2.52
P-3	J-4	J-70	436.95	12.14	36.7943	0.70
P-31	J-15	J-10	1335.13	6.08	34.1458	1.14
P-32	J-15	J-7	455.35	8.18	52.6812	1.84
P-34	J-16	J-15	416.64	6.08	34.1458	0.17
P-35	J-16	J-17	1343.13	6.08	34.1458	1.14
P-38	J-18	J-19	1348.06	6.08	34.1458	1.84
P-4	J-50	J-31	303.86	8.18	52.6812	0.52
P-41	J-20	J-21	168.80	6.08	34.1458	0.34
P-44	J-22	J-20	381.01	6.08	34.1458	0.17
P-46	J-23	J-22	387.52	6.08	34.1458	0.00
P-48	J-18	J-23	325.49	6.08	34.1458	0.57
P-49	J-23	J-76	391.70	6.08	34.1458	1.27
P-5	J-69	J-50	401.89	8.18	52.6812	0.40
P-51	J-25	J-71	454.23	6.08	34.1458	1.27
P-55	J-17	J-12	318.63	10.16	34.1458	0.00
P-56	J-26	J-17	306.82	10.16	34.1458	0.00

P-57	J-24	J-19	373.15	10.16	34.1458	0.00
P-58	J-27	J-24	43.67	10.16	34.1458	0.00
P-6	J-71	J-72	388.95	6.08	34.1458	0.40
P-60	J-25	J-27	300.24	10.16	34.1458	0.17
P-61	J-28	J-25	187.57	10.16	34.1458	0.00
P-63	J-29	J-20	1346.63	8.18	52.6812	1.14
P-67	J-30	J-69	223.04	8.18	52.6812	0.57
P-69	J-31	J-32	521.13	12.14	36.7943	0.00
P-7	J-72	J-22	509.45	6.08	34.1458	0.87
P-71	J-33	J-32	543.94	12.14	36.7943	0.00
P-8	J-73	J-74	479.27	8.18	52.6812	0.40
P-81	J-29	J-28	196.49	10.16	34.1458	0.17
P-82	J-30	J-29	151.25	10.16	34.1458	0.00
P-83	J-36	J-30	129.33	10.16	34.1458	0.00
P-84	J-32	J-28	1184.63	6.08	34.1458	1.14
P-87	J-5	J-37	2251.87	6.08	34.1458	2.51
P-9	J-74	J-8	1448.13	8.18	52.6812	2.94
P-92	J-38	J-39	1173.25	10.16	34.1458	0.87
P-97	J-40	J-41	2063.01	6.08	34.1458	2.34

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		5.19	646.90	
J-10		6.40	665.57	
J-11		0.52	666.78	
J-12		1.04	666.41	
J-13		8.47	650.77	
J-14		16.42	663.73	
J-15		9.85	660.87	
J-16		11.24	659.23	
J-17		7.78	663.22	
J-18		9.85	662.56	
J-19		5.88	668.34	
J-2		1.25	648.06	
J-20		5.53	657.89	
J-21		3.98	657.51	
J-22		5.88	658.30	
J-23		5.70	662.32	
J-24		2.07	664.89	
J-25		1.56	665.93	
J-26		5.70	666.12	
J-27		4.84	665.03	
J-28		3.98	665.85	
J-29		2.94	664.95	
J-3		0.00	648.42	
J-30		0.86	665.84	
J-31		0.69	642.05	
J-32		3.46	651.80	
J-33		4.32	649.84	
J-34		0.00	645.38	
J-35		1.10	640.76	
J-36		5.44	665.80	
J-37		12.68	650.49	

J-38		10.27	648.18	
J-39		0.00	655.00	
J-4		0.00	646.84	
J-40		14.35	641.08	
J-41		14.57	650.63	
J-42		0.52	642.94	
J-43		14.26	648.38	
J-44		11.58	640.70	
J-45		0.17	655.58	
J-46	EC-SOCWA	5.88	658.00	
J-47	EC-Ferndale	0.00	641.36	
J-48		0.00	642.16	
J-49		11.06	643.24	
J-5		11.76	642.66	
J-50	1F	2.59	661.00	
J-51		7.95	648.00	
J-52		8.99	654.88	
J-53		0.00	655.33	
J-54		0.00	653.00	
J-55		0.00	650.63	
J-56		11.39	646.80	
J-59		0.99	649.53	
J-6		0.00	643.53	
J-60		0.00	648.00	
J-61		8.99	649.02	
J-62	EC-Ferndale	0.35	643.00	
J-63	EC-Ferndale	0.00	648.19	
J-64		12.90	647.71	
J-65		11.83	642.19	
J-66		0.00	646.83	
J-68		0.00	648.00	
J-69	1R	2.77	663.00	
J-7		4.15	658.64	
J-70		0.00	648.00	
J-71	2F	2.42	665.00	
J-72	2R	3.11	662.00	
J-73	3F	3.98	657.00	
J-74	3R	11.41	654.00	
J-75	4F	3.28	663.00	
J-76	4R	3.11	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	4.15	641.00	
J-8		9.16	654.08	
J-80	6F	10.89	648.00	
J-81	7R	4.67	641.00	
J-82	7F	12.62	640.00	
J-83	8F	6.05	642.00	
J-84	8R	15.04	644.00	
J-9		1.38	659.92	
PR-1	PR-1	----	648.00	802.77

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5

MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 99
NUMBER OF END NODES .....(J) = 81
NUMBER OF PRIMARY LOOPS .....(L) = 18
NUMBER OF SUPPLY NODES .....(F) = 1
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.84901E-03

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

Existing System; Existing Maximum Day Demand

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	1.25	0.00	0.00	0.00	0.00	0.00
P-10	J-75	J-24	2.30	0.01	0.00	0.03	0.01	0.01
P-103	J-38	J-82	45.52	3.72	0.01	0.50	2.71	2.71
P-107	J-43	J-44	36.79	3.76	0.00	0.41	1.83	1.82
P-11	J-76	J-75	5.58	0.02	0.00	0.06	0.06	0.06
P-12	J-77	J-38	55.78	0.01	0.00	0.22	0.33	0.32
P-120	J-31	J-36	-14.89	0.00	0.00	0.04	0.00	0.00
P-125	J-8	J-21	48.50	0.01	0.00	0.13	0.02	0.02
P-126	J-45	J-8	-0.17	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	19.51	0.21	0.00	0.22	0.56	0.56
P-130	J-36	J-46	-31.70	0.01	0.00	0.09	0.01	0.01
P-14	J-78	J-61	-154.38	0.57	0.00	0.61	2.14	2.13
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	2.63	0.00	0.00	0.02	0.00	0.00
P-15	J-79	J-80	-4.49	0.02	0.00	0.05	0.04	0.04
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	78.02	2.66	0.01	0.86	7.36	7.34
P-155	J-40	J-5	42.10	0.97	0.00	0.47	2.35	2.34
P-156-XX	J-6	J-34						
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-61	-15.39	0.46	0.00	0.17	0.36	0.36
P-17	J-81	J-42	28.23	0.08	0.00	0.31	1.12	1.12
P-170	J-33	J-55	6.51	0.00	0.00	0.02	0.00	0.00
P-171	J-41	J-55	-6.51	0.00	0.00	0.02	0.00	0.00
P-172	J-37	J-41	-13.51	0.00	0.00	0.04	0.01	0.01
P-174	J-52	J-84	1.59	0.01	0.00	0.02	0.01	0.01
P-175	J-37	J-52	11.67	0.00	0.00	0.03	0.01	0.01
P-178	J-44	J-42	50.30	0.99	0.00	0.56	3.26	3.26
P-179	J-56	J-49	36.16	3.83	0.01	0.40	1.77	1.77
P-18	J-82	J-81	32.90	0.85	0.00	0.36	1.49	1.48

P-188	J-26	J-1	-78.59	1.36	0.01	0.48	0.79	0.79
P-189	J-43	J-77	55.78	0.08	0.00	0.22	0.33	0.32
P-19	J-83	J-6	-19.51	0.02	0.00	0.22	0.57	0.56
P-191	J-14	J-51	-93.88	1.54	0.01	0.37	0.85	0.85
P-192	J-59	J-60	-226.32	0.74	0.00	0.90	4.34	4.33
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-154.38	0.10	0.00	0.61	2.18	2.13
P-197	J-56	J-43	106.83	0.33	0.00	0.42	1.08	1.08
P-2	J-70	J-60	226.32	0.10	0.00	0.90	4.33	4.33
P-20	J-7	J-73	73.22	0.11	0.00	0.45	0.70	0.69
P-201	J-62	J-79	-0.35	0.00	0.00	0.00	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	-13.45	0.20	0.00	0.15	0.28	0.28
P-210	J-59	J-13	21.85	0.01	0.00	0.09	0.06	0.06
P-217	J-64	J-59	-203.47	0.84	0.00	0.81	3.56	3.55
P-219	J-64	J-65	11.83	0.39	0.00	0.13	0.22	0.22
P-221	J-61	J-64	-178.75	0.82	0.00	0.71	2.80	2.80
P-239	J-12	J-14	-90.84	0.22	0.00	0.36	0.80	0.80
P-24	J-9	J-7	-1.38	0.00	0.00	0.01	0.00	0.00
P-243	J-16	J-18	48.16	1.23	0.00	0.53	3.01	3.00
P-25	J-10	J-11	0.52	0.00	0.00	0.01	0.00	0.00
P-255	J-51	J-70	311.35	0.13	0.00	1.23	7.82	7.82
P-264	J-34	J-35	1.10	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	-25.10	0.26	0.00	0.28	0.90	0.90
P-266-XX	J-26	J-19						
P-268	J-3	PR-1	-413.19	0.01	0.00	1.11	0.76	0.76
P-269	J-51	J-3	-413.19	0.40	0.29	1.64	22.95	13.20
P-27	J-12	J-10	80.31	0.47	0.00	0.89	7.78	7.75
P-271	J-52	J-53	1.10	0.00	0.00	0.00	0.00	0.00
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-85.03	0.00	0.00	0.24	0.26	0.26
P-285	J-53	J-34	1.10	0.00	0.00	0.00	0.00	0.00
P-286	J-46	J-21	-37.58	0.00	0.00	0.10	0.01	0.01
P-29	J-13	J-14	13.38	0.57	0.00	0.15	0.28	0.28
P-3	J-4	J-70	-85.03	0.11	0.00	0.24	0.26	0.26
P-31	J-15	J-10	-73.39	8.75	0.01	0.81	6.56	6.56
P-32	J-15	J-7	78.75	0.36	0.01	0.48	0.80	0.79
P-34	J-16	J-15	15.21	0.15	0.00	0.17	0.36	0.36
P-35	J-16	J-17	-74.61	9.08	0.01	0.82	6.77	6.76
P-38	J-18	J-19	13.19	0.37	0.00	0.15	0.27	0.27
P-4	J-50	J-31	-2.41	0.00	0.00	0.01	0.00	0.00
P-41	J-20	J-21	-6.94	0.01	0.00	0.08	0.08	0.08
P-44	J-22	J-20	1.52	0.00	0.00	0.02	0.01	0.01
P-46	J-23	J-22	10.72	0.07	0.00	0.12	0.19	0.19
P-48	J-18	J-23	25.11	0.29	0.00	0.28	0.90	0.90
P-49	J-23	J-76	8.69	0.05	0.00	0.10	0.13	0.13
P-5	J-69	J-50	0.18	0.00	0.00	0.00	0.00	0.00
P-51	J-25	J-71	2.22	0.00	0.00	0.02	0.01	0.01
P-55	J-17	J-12	-9.50	0.00	0.00	0.04	0.01	0.01
P-56	J-26	J-17	72.89	0.16	0.00	0.29	0.53	0.53
P-57	J-24	J-19	-7.31	0.00	0.00	0.03	0.01	0.01
P-58	J-27	J-24	-7.53	0.00	0.00	0.03	0.01	0.01
P-6	J-71	J-72	-0.20	0.00	0.00	0.00	0.00	0.00
P-60	J-25	J-27	-0.06	0.00	0.00	0.00	0.00	0.00
P-61	J-28	J-25	3.71	0.00	0.00	0.01	0.00	0.00
P-63	J-29	J-20	-2.93	0.00	0.00	0.02	0.00	0.00
P-67	J-30	J-69	2.94	0.00	0.00	0.02	0.00	0.00

P-69	J-31	J-32	11.78	0.00	0.00	0.03	0.01	0.01
P-7	J-72	J-22	-3.32	0.01	0.00	0.04	0.02	0.02
P-71	J-33	J-32	-8.20	0.00	0.00	0.02	0.00	0.00
P-8	J-73	J-74	69.25	0.30	0.00	0.42	0.62	0.62
P-81	J-29	J-28	7.56	0.00	0.00	0.03	0.01	0.01
P-82	J-30	J-29	7.57	0.00	0.00	0.03	0.01	0.01
P-83	J-36	J-30	11.38	0.00	0.00	0.05	0.02	0.02
P-84	J-32	J-28	0.12	0.00	0.00	0.00	0.00	0.00
P-87	J-5	J-37	10.84	0.43	0.00	0.12	0.19	0.19
P-9	J-74	J-8	57.84	0.64	0.01	0.35	0.45	0.45
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-41	21.57	1.40	0.00	0.24	0.68	0.68

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		5.19	801.82	646.90	154.92	67.13
J-10		6.40	799.82	665.57	134.24	58.17
J-11		0.52	799.82	666.78	133.03	57.65
J-12		1.04	800.29	666.41	133.88	58.02
J-13		8.47	801.08	650.77	150.32	65.14
J-14		16.42	800.51	663.73	136.78	59.27
J-15		9.85	791.05	660.87	130.19	56.41
J-16		11.24	791.20	659.23	131.97	57.19
J-17		7.78	800.29	663.22	137.07	59.40
J-18		9.85	789.97	662.56	127.41	55.21
J-19		5.88	789.61	668.34	121.27	52.55
J-2		1.25	801.82	648.06	153.76	66.63
J-20		5.53	789.61	657.89	131.71	57.08
J-21		3.98	789.62	657.51	132.11	57.25
J-22		5.88	789.61	658.30	131.31	56.90
J-23		5.70	789.68	662.32	127.36	55.19
J-24		2.07	789.60	664.89	124.71	54.04
J-25		1.56	789.60	665.93	123.67	53.59
J-26		5.70	800.45	666.12	134.34	58.21
J-27		4.84	789.60	665.03	124.57	53.98
J-28		3.98	789.60	665.85	123.75	53.63
J-29		2.94	789.60	664.95	124.66	54.02
J-3		0.00	802.76	648.42	154.33	66.88
J-30		0.86	789.61	665.84	123.76	53.63
J-31		0.69	789.61	642.05	147.55	63.94
J-32		3.46	789.60	651.80	137.80	59.71
J-33		4.32	789.60	649.84	139.76	60.56
J-34		0.00	789.59	645.38	144.21	62.49
J-35		1.10	789.59	640.76	148.83	64.49
J-36		5.44	789.61	665.80	123.81	53.65
J-37		12.68	789.60	650.49	139.10	60.28
J-38		10.27	798.34	648.18	150.16	65.07
J-39		0.00	798.34	655.00	143.34	62.11
J-4		0.00	801.82	646.84	154.98	67.16
J-40		14.35	791.00	641.08	149.92	64.97
J-41		14.57	789.60	650.63	138.97	60.22
J-42		0.52	793.67	642.94	150.73	65.32
J-43		14.26	798.43	648.38	150.05	65.02

J-44		11.58	794.67	640.70	153.97	66.72
J-45		0.17	789.63	655.58	134.05	58.09
J-46	EC-SOCWA	5.88	789.62	658.00	131.62	57.03
J-47	EC-Ferndale	0.00	789.59	641.36	148.23	64.23
J-48		0.00	789.59	642.16	147.43	63.89
J-49		11.06	794.92	643.24	151.68	65.73
J-5		11.76	790.02	642.66	147.36	63.86
J-50	1F	2.59	789.60	661.00	128.60	55.73
J-51		7.95	802.06	648.00	154.06	66.76
J-52		8.99	789.59	654.88	134.71	58.37
J-53		0.00	789.59	655.33	134.27	58.18
J-54		0.00	789.59	653.00	136.59	59.19
J-55		0.00	789.60	650.63	138.97	60.22
J-56		11.39	798.76	646.80	151.96	65.85
J-59		0.99	801.09	649.53	151.56	65.68
J-6		0.00	789.81	643.53	146.28	63.39
J-60		0.00	801.84	648.00	153.84	66.66
J-61		8.99	799.42	649.02	150.40	65.17
J-62	EC-Ferndale	0.35	798.94	643.00	155.94	67.57
J-63	EC-Ferndale	0.00	801.08	648.19	152.89	66.25
J-64		12.90	800.25	647.71	152.54	66.10
J-65		11.83	799.86	642.19	157.66	68.32
J-66		0.00	801.82	646.83	154.99	67.16
J-68		0.00	801.84	648.00	153.84	66.66
J-69	1R	2.77	789.60	663.00	126.60	54.86
J-7		4.15	790.69	658.64	132.05	57.22
J-70		0.00	801.94	648.00	153.94	66.71
J-71	2F	2.42	789.60	665.00	124.60	53.99
J-72	2R	3.11	789.60	662.00	127.60	55.29
J-73	3F	3.98	790.58	657.00	133.58	57.88
J-74	3R	11.41	790.28	654.00	136.28	59.05
J-75	4F	3.28	789.61	663.00	126.61	54.86
J-76	4R	3.11	789.63	661.00	128.63	55.74
J-77	5F	0.00	798.34	648.00	150.34	65.15
J-78	5R	0.00	798.86	647.00	151.86	65.80
J-79	6R	4.15	798.94	641.00	157.94	68.44
J-8		9.16	789.63	654.08	135.55	58.74
J-80	6F	10.89	798.96	648.00	150.96	65.42
J-81	7R	4.67	793.75	641.00	152.75	66.19
J-82	7F	12.62	794.61	640.00	154.61	67.00
J-83	8F	6.05	789.79	642.00	147.79	64.04
J-84	8R	15.04	789.59	644.00	145.59	63.09
J-9		1.38	790.69	659.92	130.77	56.66
PR-1	PR-1	----	802.77	648.00	154.77	67.07

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-79	68.44	J-19	52.55
J-65	68.32	J-25	53.59
J-62	67.57	J-28	53.63
J-66	67.16	J-30	53.63
J-4	67.16	J-36	53.65

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	1.64	P-60	0.00
P-255	1.23	P-126	0.00
P-268	1.11	P-5	0.00
P-192	0.90	P-84	0.00
P-2	0.90	P-6	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	22.95	P-126	0.00
P-255	7.82	P-60	0.00
P-27	7.78	P-5	0.00
P-154	7.36	P-84	0.00
P-35	6.77	P-271	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	13.20	P-126	0.00
P-255	7.82	P-60	0.00
P-27	7.75	P-5	0.00
P-154	7.34	P-84	0.00
P-35	6.76	P-264	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
PR-1	413.19	PR-1

NET SYSTEM INFLOW = 413.19
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 413.19

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FireFlow/Hydrant Report

Fireflow/Hydrant Report:

Specified Minimum Pressure(psi or kPa): 20.0
Minimum Static Pressure(psi or kPa) : 20.0
Sp.Min Pres@FirePump Suctn(psi or kPa): 0.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2
Flow-3: Flowrate to maintain the specified pressure at Fire Pump Suction
(Flow-3 is based on combined value of hydrant and hose constants)

Hose Constant = 0.00

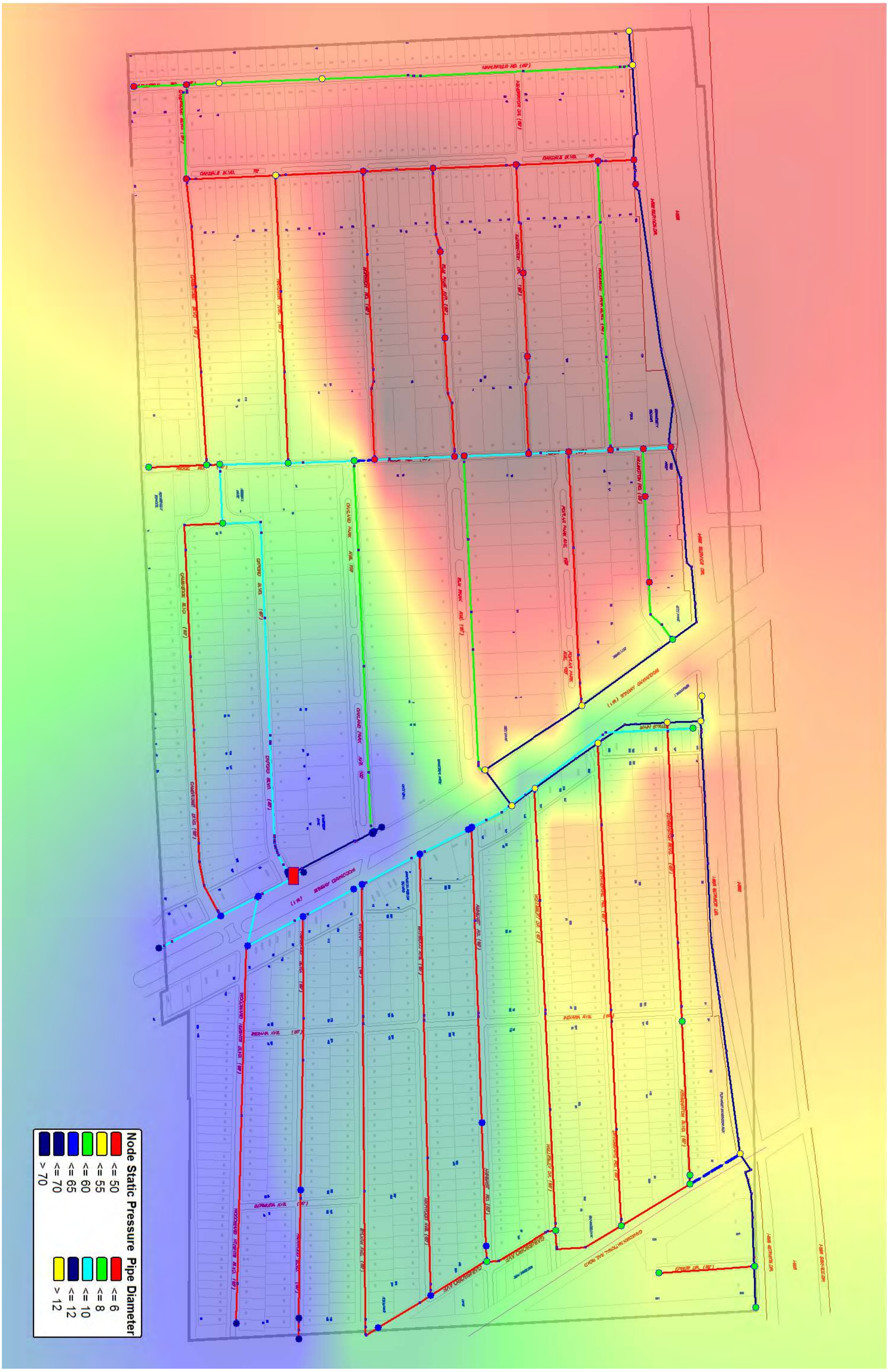
Hydrant Node	Hydrant Constant	Elevation	Demand gpm	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2
J-1	0.0	646.9	5.2	67.1	2939.7	2922.0	J-2
J-10	0.0	665.6	6.4	58.2	1003.2	994.8	J-11
J-11	0.0	666.8	0.5	57.6	481.4		
J-12	0.0	666.4	1.0	58.0	1419.3	1416.6	J-11
J-13	0.0	650.8	8.5	65.1	1963.2		
J-14	0.0	663.7	16.4	59.3	1516.5		
J-15	0.0	660.9	9.9	56.4	503.5	496.7	J-19
J-16	0.0	659.2	11.2	57.2	505.2		
J-17	0.0	663.2	7.8	59.4	1417.5		
J-18	0.0	662.6	9.9	55.2	438.7		
J-19	0.0	668.3	5.9	52.5	421.4		
J-2	0.0	648.1	1.2	66.6	2814.2		
J-20	0.0	657.9	5.5	57.1	464.5	446.3	J-19
J-21	0.0	657.5	4.0	57.2	484.6	446.0	J-19
J-22	0.0	658.3	5.9	56.9	429.5		
J-23	0.0	662.3	5.7	55.2	418.6		
J-24	0.0	664.9	2.1	54.0	444.3	431.0	J-19
J-25	0.0	665.9	1.6	53.6	442.5	436.4	J-19
J-26	0.0	666.1	5.7	58.2	1359.5		
J-27	0.0	665.0	4.8	54.0	447.7	435.1	J-19
J-28	0.0	665.9	4.0	53.6	446.8	441.2	J-19
J-29	0.0	664.9	2.9	54.0	451.5	442.3	J-19
J-3	0.0	648.4	0.0	66.9	53756.9	44073.1	J-19
J-30	0.0	665.8	0.9	53.6	447.0	441.4	J-19
J-31	0.0	642.1	0.7	63.9	538.8	441.5	J-19
J-32	0.0	651.8	3.5	59.7	504.3	444.1	J-19
J-33	0.0	649.8	4.3	60.6	513.0	446.3	J-19
J-34	0.0	645.4	0.0	62.5	464.0	445.7	J-19
J-35	0.0	640.8	1.1	64.5	468.7	446.8	J-19
J-36	0.0	665.8	5.4	53.7	453.2	446.5	J-19
J-37	0.0	650.5	12.7	60.3	512.8	457.7	J-19
J-38	0.0	648.2	10.3	65.1	1004.6	963.8	J-39
J-39	0.0	655.0	0.0	62.1	684.2		
J-4	0.0	646.8	0.0	67.2	2952.9	2934.9	J-2
J-40	0.0	641.1	14.3	65.0	558.8	540.2	J-19
J-41	0.0	650.6	14.6	60.2	518.7	458.3	J-19
J-42	0.0	642.9	0.5	65.3	632.9		
J-43	0.0	648.4	14.3	65.0	1103.5	1060.4	J-39
J-44	0.0	640.7	11.6	66.7	640.1		
J-45	0.0	655.6	0.2	58.1	487.2	442.6	J-19
J-46	0.0	658.0	5.9	57.0	484.6	447.8	J-19
J-47	0.0	641.4	0.0	64.2	462.4	445.7	J-19

J-48	0.0	642.2	0.0	63.9	315.6		
J-49	0.0	643.2	11.1	65.7	538.1		
J-5	0.0	642.7	11.8	63.9	467.2		
J-50	0.0	661.0	2.6	55.7	460.0	443.4	J-19
J-51	0.0	648.0	8.0	66.8	5281.6	4314.0	J-19
J-52	0.0	654.9	9.0	58.4	486.6	454.7	J-19
J-53	0.0	655.3	0.0	58.2	472.3	445.7	J-19
J-54	0.0	653.0	0.0	59.2	477.9	445.7	J-19
J-55	0.0	650.6	0.0	60.2	504.8	443.0	J-19
J-56	0.0	646.8	11.4	65.8	1248.9	1188.8	J-39
J-59	0.0	649.5	1.0	65.7	2565.3	2485.2	J-39
J-6	0.0	643.5	0.0	63.4	386.6		
J-60	0.0	648.0	0.0	66.7	4138.6	3604.1	J-19
J-61	0.0	649.0	9.0	65.2	1447.6	1397.3	J-39
J-62	0.0	643.0	0.3	67.6	214.2		
J-63	0.0	648.2	0.0	66.3	1449.9		
J-64	0.0	647.7	12.9	66.1	1850.9	1774.5	J-39
J-65	0.0	642.2	11.8	68.3	243.3		
J-66	0.0	646.8	0.0	67.2	2330.8		
J-68	0.0	648.0	0.0	66.7	3186.0		
J-69	0.0	663.0	2.8	54.9	453.4	443.5	J-19
J-7	0.0	658.6	4.1	57.2	493.8	481.3	J-19
J-70	0.0	648.0	0.0	66.7	4700.5	3882.2	J-19
J-71	0.0	665.0	2.4	54.0	356.8		
J-72	0.0	662.0	3.1	55.3	359.3		
J-73	0.0	657.0	4.0	57.9	496.7	478.2	J-19
J-74	0.0	654.0	11.4	59.1	508.0	477.1	J-19
J-75	0.0	663.0	3.3	54.9	359.5		
J-76	0.0	661.0	3.1	55.7	367.9		
J-77	0.0	648.0	0.0	65.1	1001.3	959.3	J-39
J-78	0.0	647.0	0.0	65.8	1262.6	1203.0	J-39
J-79	0.0	641.0	4.1	68.4	225.6	223.3	J-62
J-8	0.0	654.1	9.2	58.7	502.8	451.6	J-19
J-80	0.0	648.0	10.9	65.4	269.7		
J-81	0.0	641.0	4.7	66.2	610.9		
J-82	0.0	640.0	12.6	67.0	522.7		
J-83	0.0	642.0	6.1	64.0	391.9		
J-84	0.0	644.0	15.0	63.1	364.1		
J-9	0.0	659.9	1.4	56.7	465.4		

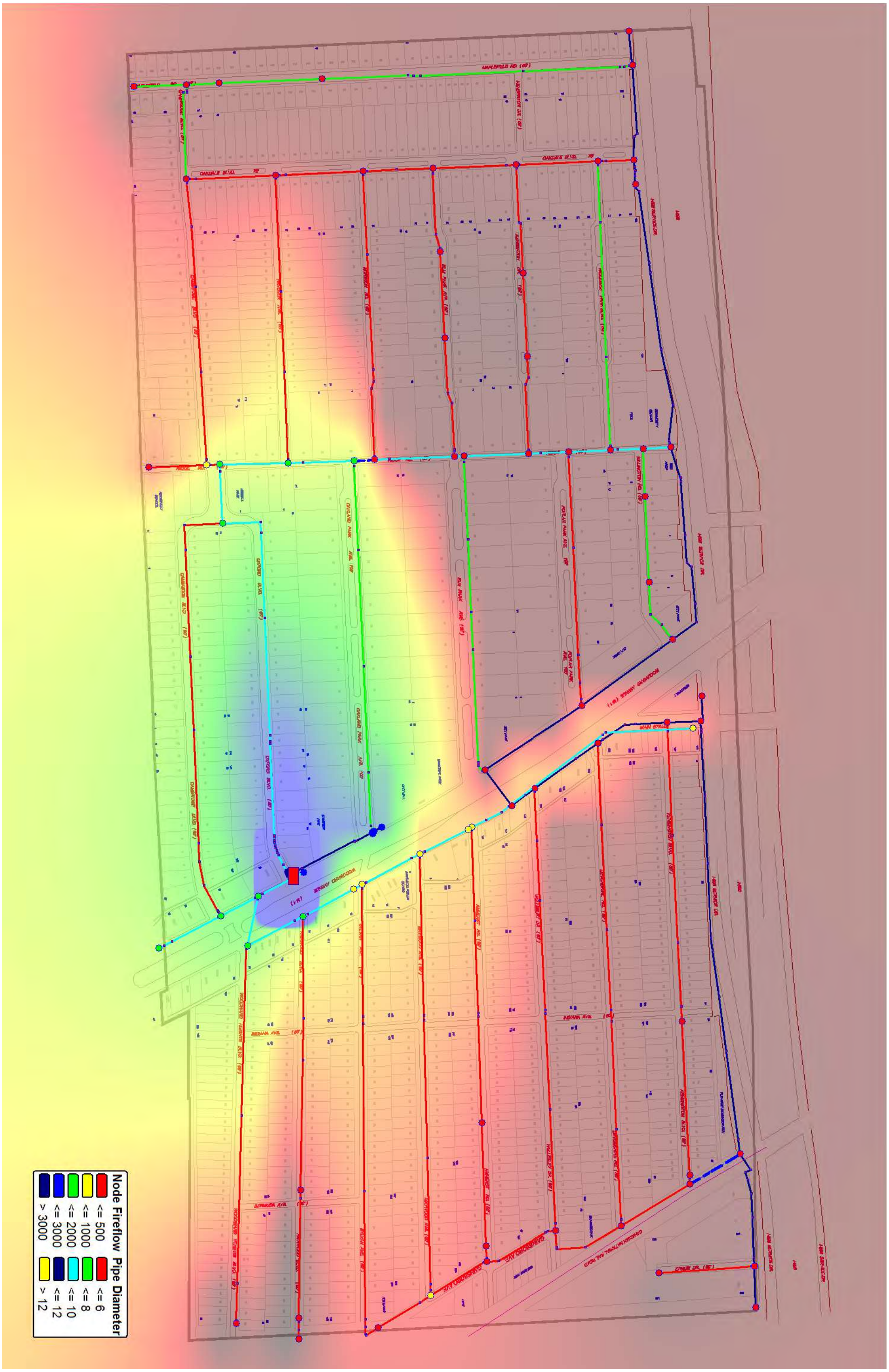
APPENDIX E

Existing Water Distribution System; Existing Peak Hour Demand Results

Includes:
Static Pressure Gradient Map; Existing System, Existing Peak Hour Demand
Available Fire Flow Gradient Map; Existing System, Existing Peak Hour Demand
Computer Model Simulation; Existing System, Existing Peak Hour Demand



Static Pressure; Existing System; Existing Peak Hour Demand



Available Fire Flow; Existing System; Existing Peak Hour Demand

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 7.022a  07/08/2015                              *
*  Serial #:  6-5116761                                     *
*  Interface:  Classic                                      *
*  Licensed for Pipe2014                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 Date & Time:  Wed Jan 13 09:57:36 2016

 Master File : m:\0175\0175-0095\gen\reports\kypipe\import\socwa
revision\watermodel2015.KYP\watermodel2015.P2K
```

SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.14	36.7943	0.00
P-10	J-75	J-24	557.86	6.08	34.1458	1.27
P-103	J-38	J-82	1375.77	6.08	34.1458	1.54
P-107	J-43	J-44	2058.36	6.08	34.1458	1.37
P-11	J-76	J-75	402.54	6.08	34.1458	0.40
P-12	J-77	J-38	19.18	10.16	34.1458	0.17
P-120	J-31	J-36	972.64	12.34	80.3947	2.37
P-125	J-8	J-21	445.59	12.34	80.3947	0.70
P-126	J-45	J-8	160.81	12.34	80.3947	0.00
P-13	J-5	J-6	373.36	6.08	34.1458	0.00
P-130	J-36	J-46	1250.08	12.34	80.3947	1.79
P-14	J-78	J-61	266.57	10.16	34.1458	0.17
P-148	J-47	J-35	190.47	12.14	36.7943	0.17
P-149	J-27	J-33	1489.24	8.18	52.6812	2.98
P-15	J-79	J-80	597.22	6.08	34.1458	0.57
P-152	J-48	J-35	445.75	6.08	34.1458	0.57
P-154	J-42	J-40	362.71	6.08	34.1458	0.70
P-155	J-40	J-5	415.41	6.08	34.1458	1.27
P-156-XX	J-6	J-34	275.42	6.08	34.1458	0.17
P-157	J-53	J-54	124.93	12.14	36.7943	0.75
P-16	J-80	J-61	1275.42	6.08	34.1458	0.57
P-17	J-81	J-42	72.50	6.08	34.1458	0.17
P-170	J-33	J-55	209.02	12.14	36.7943	0.34

P-171	J-41	J-55	134.03	12.14	36.7943	0.00
P-172	J-37	J-41	362.21	12.14	36.7943	0.00
P-174	J-52	J-84	1394.38	6.08	34.1458	1.54
P-175	J-37	J-52	349.33	12.14	36.7943	0.69
P-178	J-44	J-42	304.86	6.08	34.1458	0.35
P-179	J-56	J-49	2164.85	6.08	34.1458	2.06
P-18	J-82	J-81	575.79	6.08	34.1458	0.57
P-188	J-26	J-1	1732.31	8.18	52.6812	1.89
P-189	J-43	J-77	250.49	10.16	34.1458	0.57
P-19	J-83	J-6	42.96	6.08	34.1458	0.17
P-191	J-14	J-51	1820.36	10.16	34.1458	2.81
P-192	J-59	J-60	171.60	10.16	34.1458	0.17
P-192a	J-60	J-68	67.12	10.16	34.1458	0.17
P-195	J-56	J-78	45.89	10.16	34.1458	0.40
P-197	J-56	J-43	304.88	10.16	34.1458	0.57
P-2	J-70	J-60	22.81	10.16	34.1458	0.00
P-20	J-7	J-73	152.54	8.18	52.6812	0.57
P-201	J-62	J-79	95.36	6.08	34.1458	0.57
P-209	J-13	J-63	324.39	10.16	34.1458	0.34
P-21	J-84	J-83	716.44	6.08	34.1458	0.40
P-210	J-59	J-13	198.02	10.16	34.1458	0.17
P-217	J-64	J-59	236.90	10.16	34.1458	0.17
P-219	J-64	J-65	1762.12	6.08	34.1458	1.49
P-221	J-61	J-64	294.29	10.16	34.1458	0.17
P-239	J-12	J-14	275.83	10.16	34.1458	0.17
P-24	J-9	J-7	245.04	8.18	52.6812	0.17
P-243	J-16	J-18	408.03	6.08	34.1458	0.17
P-25	J-10	J-11	270.51	6.08	34.1458	0.00
P-255	J-51	J-70	16.36	10.16	34.1458	0.00
P-264	J-34	J-35	559.29	12.14	36.7943	1.62
P-265	J-44	J-49	287.63	6.08	34.1458	0.17
P-266-XX	J-26	J-19	95.17	10.16	34.1458	0.00
P-268	J-3	PR-1	17.14	12.34	95.9564	0.00
P-269	J-51	J-3	30.19	10.16	34.1458	7.09
P-27	J-12	J-10	61.27	6.08	34.1458	0.17
P-271	J-52	J-53	156.58	12.14	36.7943	0.00
P-272	J-66	J-4	8.87	6.08	34.1458	0.17
P-275	J-1	J-4	9.76	12.14	36.7943	0.00
P-285	J-53	J-34	2026.54	12.14	36.7943	0.34
P-286	J-46	J-21	116.24	12.34	80.3947	0.87
P-29	J-13	J-14	2021.68	6.08	34.1458	2.52
P-3	J-4	J-70	436.95	12.14	36.7943	0.70
P-31	J-15	J-10	1335.13	6.08	34.1458	1.14
P-32	J-15	J-7	455.35	8.18	52.6812	1.84
P-34	J-16	J-15	416.64	6.08	34.1458	0.17
P-35	J-16	J-17	1343.13	6.08	34.1458	1.14
P-38	J-18	J-19	1348.06	6.08	34.1458	1.84
P-4	J-50	J-31	303.86	8.18	52.6812	0.52
P-41	J-20	J-21	168.80	6.08	34.1458	0.34
P-44	J-22	J-20	381.01	6.08	34.1458	0.17
P-46	J-23	J-22	387.52	6.08	34.1458	0.00
P-48	J-18	J-23	325.49	6.08	34.1458	0.57
P-49	J-23	J-76	391.70	6.08	34.1458	1.27
P-5	J-69	J-50	401.89	8.18	52.6812	0.40
P-51	J-25	J-71	454.23	6.08	34.1458	1.27
P-55	J-17	J-12	318.63	10.16	34.1458	0.00
P-56	J-26	J-17	306.82	10.16	34.1458	0.00

P-57	J-24	J-19	373.15	10.16	34.1458	0.00
P-58	J-27	J-24	43.67	10.16	34.1458	0.00
P-6	J-71	J-72	388.95	6.08	34.1458	0.40
P-60	J-25	J-27	300.24	10.16	34.1458	0.17
P-61	J-28	J-25	187.57	10.16	34.1458	0.00
P-63	J-29	J-20	1346.63	8.18	52.6812	1.14
P-67	J-30	J-69	223.04	8.18	52.6812	0.57
P-69	J-31	J-32	521.13	12.14	36.7943	0.00
P-7	J-72	J-22	509.45	6.08	34.1458	0.87
P-71	J-33	J-32	543.94	12.14	36.7943	0.00
P-8	J-73	J-74	479.27	8.18	52.6812	0.40
P-81	J-29	J-28	196.49	10.16	34.1458	0.17
P-82	J-30	J-29	151.25	10.16	34.1458	0.00
P-83	J-36	J-30	129.33	10.16	34.1458	0.00
P-84	J-32	J-28	1184.63	6.08	34.1458	1.14
P-87	J-5	J-37	2251.87	6.08	34.1458	2.51
P-9	J-74	J-8	1448.13	8.18	52.6812	2.94
P-92	J-38	J-39	1173.25	10.16	34.1458	0.87
P-97	J-40	J-41	2063.01	6.08	34.1458	2.34

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		8.30	646.90	
J-10		10.23	665.57	
J-11		0.83	666.78	
J-12		1.66	666.41	
J-13		13.55	650.77	
J-14		26.28	663.73	
J-15		15.77	660.87	
J-16		17.98	659.23	
J-17		12.45	663.22	
J-18		15.77	662.56	
J-19		9.40	668.34	
J-2		2.00	648.06	
J-20		8.85	657.89	
J-21		6.36	657.51	
J-22		9.40	658.30	
J-23		9.13	662.32	
J-24		3.32	664.89	
J-25		2.49	665.93	
J-26		9.13	666.12	
J-27		7.74	665.03	
J-28		6.36	665.85	
J-29		4.70	664.95	
J-3		0.00	648.42	
J-30		1.38	665.84	
J-31		1.11	642.05	
J-32		5.53	651.80	
J-33		6.91	649.84	
J-34		0.00	645.38	
J-35		1.76	640.76	
J-36		8.70	665.80	
J-37		20.28	650.49	

J-38		16.43	648.18	
J-39		0.00	655.00	
J-4		0.00	646.84	
J-40		22.96	641.08	
J-41		23.31	650.63	
J-42		0.83	642.94	
J-43		22.81	648.38	
J-44		18.53	640.70	
J-45		0.28	655.58	
J-46	EC-SOCWA	9.40	658.00	
J-47	EC-Ferndale	0.00	641.36	
J-48		0.00	642.16	
J-49		17.70	643.24	
J-5		18.81	642.66	
J-50	1F	4.15	661.00	
J-51		12.72	648.00	
J-52		14.38	654.88	
J-53		0.00	655.33	
J-54		0.00	653.00	
J-55		0.00	650.63	
J-56		18.22	646.80	
J-59		1.58	649.53	
J-6		0.00	643.53	
J-60		0.00	648.00	
J-61		14.38	649.02	
J-62	EC-Ferndale	0.55	643.00	
J-63	EC-Ferndale	0.00	648.19	
J-64		20.63	647.71	
J-65		18.93	642.19	
J-66		0.00	646.83	
J-68		0.00	648.00	
J-69	1R	4.43	663.00	
J-7		6.64	658.64	
J-70		0.00	648.00	
J-71	2F	3.87	665.00	
J-72	2R	4.98	662.00	
J-73	3F	6.36	657.00	
J-74	3R	18.26	654.00	
J-75	4F	5.26	663.00	
J-76	4R	4.98	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	6.64	641.00	
J-8		14.66	654.08	
J-80	6F	17.43	648.00	
J-81	7R	7.47	641.00	
J-82	7F	20.19	640.00	
J-83	8F	9.68	642.00	
J-84	8R	24.06	644.00	
J-9		2.21	659.92	
PR-1	PR-1	----	648.00	802.77

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5

MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 99
NUMBER OF END NODES .....(J) = 81
NUMBER OF PRIMARY LOOPS .....(L) = 18
NUMBER OF SUPPLY NODES .....(F) = 1
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.60339E-03

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

Existing System; Existing Peak Hour Demand

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	2.00	0.00	0.00	0.01	0.00	0.00
P-10	J-75	J-24	3.68	0.01	0.00	0.04	0.03	0.03
P-103	J-38	J-82	72.83	8.89	0.02	0.80	6.47	6.46
P-107	J-43	J-44	58.86	8.97	0.01	0.65	4.36	4.36
P-11	J-76	J-75	8.93	0.05	0.00	0.10	0.13	0.13
P-12	J-77	J-38	89.25	0.01	0.00	0.35	0.79	0.77
P-120	J-31	J-36	-23.69	0.01	0.00	0.06	0.01	0.01
P-125	J-8	J-21	77.59	0.02	0.00	0.21	0.05	0.05
P-126	J-45	J-8	-0.28	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	31.21	0.50	0.00	0.34	1.35	1.35
P-130	J-36	J-46	-50.69	0.03	0.00	0.14	0.02	0.02
P-14	J-78	J-61	-247.00	1.36	0.00	0.98	5.10	5.09
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	4.03	0.00	0.00	0.02	0.00	0.00
P-15	J-79	J-80	-7.19	0.05	0.00	0.08	0.09	0.09
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	124.82	6.36	0.02	1.38	17.59	17.53
P-155	J-40	J-5	67.36	2.32	0.01	0.74	5.62	5.59
P-156-XX	J-6	J-34						
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-61	-24.62	1.11	0.00	0.27	0.87	0.87
P-17	J-81	J-42	45.17	0.19	0.00	0.50	2.68	2.67
P-170	J-33	J-55	10.42	0.00	0.00	0.03	0.01	0.01
P-171	J-41	J-55	-10.42	0.00	0.00	0.03	0.01	0.01
P-172	J-37	J-41	-21.62	0.01	0.00	0.06	0.02	0.02
P-174	J-52	J-84	2.54	0.02	0.00	0.03	0.01	0.01
P-175	J-37	J-52	18.68	0.01	0.00	0.05	0.02	0.02
P-178	J-44	J-42	80.49	2.37	0.00	0.89	7.79	7.78
P-179	J-56	J-49	57.86	9.14	0.01	0.64	4.23	4.22
P-18	J-82	J-81	52.64	2.04	0.00	0.58	3.55	3.54

P-188	J-26	J-1	-125.75	3.25	0.02	0.77	1.89	1.88
P-189	J-43	J-77	89.25	0.19	0.00	0.35	0.78	0.77
P-19	J-83	J-6	-31.21	0.06	0.00	0.34	1.35	1.35
P-191	J-14	J-51	-150.21	3.69	0.02	0.59	2.03	2.03
P-192	J-59	J-60	-362.11	1.77	0.01	1.43	10.37	10.34
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-247.00	0.23	0.01	0.98	5.22	5.09
P-197	J-56	J-43	170.93	0.78	0.00	0.68	2.59	2.57
P-2	J-70	J-60	362.11	0.24	0.00	1.43	10.34	10.34
P-20	J-7	J-73	117.14	0.25	0.00	0.72	1.68	1.65
P-201	J-62	J-79	-0.55	0.00	0.00	0.01	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	-21.53	0.48	0.00	0.24	0.68	0.68
P-210	J-59	J-13	34.97	0.03	0.00	0.14	0.14	0.14
P-217	J-64	J-59	-325.56	2.01	0.00	1.29	8.51	8.49
P-219	J-64	J-65	18.93	0.94	0.00	0.21	0.53	0.53
P-221	J-61	J-64	-285.99	1.97	0.00	1.13	6.69	6.68
P-239	J-12	J-14	-145.36	0.53	0.00	0.58	1.91	1.91
P-24	J-9	J-7	-2.21	0.00	0.00	0.01	0.00	0.00
P-243	J-16	J-18	77.07	2.93	0.00	0.85	7.18	7.18
P-25	J-10	J-11	0.83	0.00	0.00	0.01	0.00	0.00
P-255	J-51	J-70	498.16	0.31	0.00	1.97	18.66	18.66
P-264	J-34	J-35	1.76	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	-40.15	0.62	0.00	0.44	2.15	2.15
P-266-XX	J-26	J-19						
P-268	J-3	PR-1	-661.10	0.03	0.00	1.77	1.80	1.80
P-269	J-51	J-3	-661.10	0.95	0.75	2.62	56.47	31.52
P-27	J-12	J-10	128.49	1.13	0.01	1.42	18.58	18.50
P-271	J-52	J-53	1.76	0.00	0.00	0.00	0.00	0.00
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-136.05	0.01	0.00	0.38	0.62	0.62
P-285	J-53	J-34	1.76	0.00	0.00	0.00	0.00	0.00
P-286	J-46	J-21	-60.10	0.00	0.00	0.16	0.03	0.03
P-29	J-13	J-14	21.42	1.35	0.00	0.24	0.67	0.67
P-3	J-4	J-70	-136.05	0.27	0.00	0.38	0.62	0.62
P-31	J-15	J-10	-117.43	20.90	0.03	1.30	15.68	15.65
P-32	J-15	J-7	125.99	0.86	0.02	0.77	1.92	1.88
P-34	J-16	J-15	24.33	0.35	0.00	0.27	0.85	0.85
P-35	J-16	J-17	-119.37	21.68	0.03	1.32	16.16	16.14
P-38	J-18	J-19	21.11	0.88	0.00	0.23	0.65	0.65
P-4	J-50	J-31	-3.98	0.00	0.00	0.02	0.00	0.00
P-41	J-20	J-21	-11.13	0.03	0.00	0.12	0.20	0.20
P-44	J-22	J-20	2.43	0.00	0.00	0.03	0.01	0.01
P-46	J-23	J-22	17.15	0.17	0.00	0.19	0.44	0.44
P-48	J-18	J-23	40.19	0.70	0.00	0.44	2.15	2.15
P-49	J-23	J-76	13.91	0.12	0.00	0.15	0.30	0.30
P-5	J-69	J-50	0.16	0.00	0.00	0.00	0.00	0.00
P-51	J-25	J-71	3.54	0.01	0.00	0.04	0.02	0.02
P-55	J-17	J-12	-15.20	0.01	0.00	0.06	0.03	0.03
P-56	J-26	J-17	116.62	0.39	0.00	0.46	1.27	1.27
P-57	J-24	J-19	-11.71	0.01	0.00	0.05	0.02	0.02
P-58	J-27	J-24	-12.06	0.00	0.00	0.05	0.02	0.02
P-6	J-71	J-72	-0.33	0.00	0.00	0.00	0.00	0.00
P-60	J-25	J-27	-0.29	0.00	0.00	0.00	0.00	0.00
P-61	J-28	J-25	5.73	0.00	0.00	0.02	0.00	0.00
P-63	J-29	J-20	-4.71	0.01	0.00	0.03	0.00	0.00
P-67	J-30	J-69	4.59	0.00	0.00	0.03	0.00	0.00

P-69	J-31	J-32	18.60	0.01	0.00	0.05	0.02	0.02
P-7	J-72	J-22	-5.31	0.03	0.00	0.06	0.05	0.05
P-71	J-33	J-32	-13.31	0.00	0.00	0.04	0.01	0.01
P-8	J-73	J-74	110.78	0.71	0.00	0.68	1.49	1.48
P-81	J-29	J-28	12.34	0.00	0.00	0.05	0.02	0.02
P-82	J-30	J-29	12.33	0.00	0.00	0.05	0.02	0.02
P-83	J-36	J-30	18.30	0.01	0.00	0.07	0.04	0.04
P-84	J-32	J-28	-0.24	0.00	0.00	0.00	0.00	0.00
P-87	J-5	J-37	17.34	1.02	0.00	0.19	0.45	0.45
P-9	J-74	J-8	92.52	1.54	0.01	0.56	1.07	1.06
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-41	34.51	3.34	0.01	0.38	1.62	1.62

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		8.30	800.45	646.90	153.55	66.54
J-10		10.23	795.66	665.57	130.09	56.37
J-11		0.83	795.66	666.78	128.88	55.85
J-12		1.66	796.80	666.41	130.39	56.50
J-13		13.55	798.69	650.77	147.92	64.10
J-14		26.28	797.33	663.73	133.60	57.89
J-15		15.77	774.73	660.87	113.87	49.34
J-16		17.98	775.09	659.23	115.86	50.20
J-17		12.45	796.79	663.22	133.58	57.88
J-18		15.77	772.16	662.56	109.59	47.49
J-19		9.40	771.28	668.34	102.94	44.61
J-2		2.00	800.45	648.06	152.40	66.04
J-20		8.85	771.28	657.89	113.39	49.13
J-21		6.36	771.31	657.51	113.81	49.32
J-22		9.40	771.28	658.30	112.99	48.96
J-23		9.13	771.46	662.32	109.13	47.29
J-24		3.32	771.27	664.89	106.38	46.10
J-25		2.49	771.27	665.93	105.34	45.65
J-26		9.13	797.18	666.12	131.07	56.80
J-27		7.74	771.27	665.03	106.24	46.04
J-28		6.36	771.27	665.85	105.42	45.68
J-29		4.70	771.27	664.95	106.33	46.07
J-3		0.00	802.74	648.42	154.31	66.87
J-30		1.38	771.28	665.84	105.43	45.69
J-31		1.11	771.28	642.05	129.23	56.00
J-32		5.53	771.27	651.80	119.46	51.77
J-33		6.91	771.26	649.84	121.43	52.62
J-34		0.00	771.25	645.38	125.87	54.54
J-35		1.76	771.25	640.76	130.49	56.54
J-36		8.70	771.28	665.80	105.48	45.71
J-37		20.28	771.26	650.49	120.76	52.33
J-38		16.43	792.13	648.18	143.96	62.38
J-39		0.00	792.13	655.00	137.13	59.42
J-4		0.00	800.46	646.84	153.61	66.57
J-40		22.96	774.61	641.08	133.53	57.86
J-41		23.31	771.26	650.63	120.64	52.28
J-42		0.83	780.99	642.94	138.05	59.82
J-43		22.81	792.34	648.38	143.97	62.39

J-44		18.53	783.36	640.70	142.67	61.82
J-45		0.28	771.34	655.58	115.76	50.16
J-46	EC-SOCWA	9.40	771.31	658.00	113.31	49.10
J-47	EC-Ferndale	0.00	771.25	641.36	129.88	56.28
J-48		0.00	771.25	642.16	129.09	55.94
J-49		17.70	783.98	643.24	140.74	60.99
J-5		18.81	772.28	642.66	129.61	56.17
J-50	1F	4.15	771.28	661.00	110.28	47.79
J-51		12.72	801.03	648.00	153.03	66.31
J-52		14.38	771.25	654.88	116.37	50.43
J-53		0.00	771.25	655.33	115.92	50.23
J-54		0.00	771.25	653.00	118.25	51.24
J-55		0.00	771.26	650.63	120.64	52.28
J-56		18.22	793.13	646.80	146.33	63.41
J-59		1.58	798.71	649.53	149.18	64.64
J-6		0.00	771.77	643.53	128.24	55.57
J-60		0.00	800.49	648.00	152.49	66.08
J-61		14.38	794.73	649.02	145.71	63.14
J-62	EC-Ferndale	0.55	793.57	643.00	150.57	65.25
J-63	EC-Ferndale	0.00	798.69	648.19	150.50	65.22
J-64		20.63	796.70	647.71	148.99	64.56
J-65		18.93	795.76	642.19	153.57	66.55
J-66		0.00	800.46	646.83	153.63	66.57
J-68		0.00	800.49	648.00	152.49	66.08
J-69	1R	4.43	771.28	663.00	108.28	46.92
J-7		6.64	773.86	658.64	115.22	49.93
J-70		0.00	800.73	648.00	152.73	66.18
J-71	2F	3.87	771.26	665.00	106.26	46.05
J-72	2R	4.98	771.26	662.00	109.26	47.35
J-73	3F	6.36	773.60	657.00	116.60	50.53
J-74	3R	18.26	772.89	654.00	118.89	51.52
J-75	4F	5.26	771.28	663.00	108.28	46.92
J-76	4R	4.98	771.34	661.00	110.34	47.81
J-77	5F	0.00	792.15	648.00	144.15	62.46
J-78	5R	0.00	793.37	647.00	146.37	63.43
J-79	6R	6.64	793.57	641.00	152.57	66.11
J-8		14.66	771.34	654.08	117.26	50.81
J-80	6F	17.43	793.62	648.00	145.62	63.10
J-81	7R	7.47	781.18	641.00	140.18	60.75
J-82	7F	20.19	783.23	640.00	143.23	62.06
J-83	8F	9.68	771.72	642.00	129.72	56.21
J-84	8R	24.06	771.23	644.00	127.23	55.13
J-9		2.21	773.86	659.92	113.94	49.37
PR-1	PR-1	----	802.77	648.00	154.77	67.07

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
PR-1	67.07	J-19	44.61
J-3	66.87	J-25	45.65
J-66	66.57	J-28	45.68
J-4	66.57	J-30	45.69
J-65	66.55	J-36	45.71

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	2.62	P-126	0.00
P-255	1.97	P-5	0.00
P-268	1.77	P-60	0.00
P-192	1.43	P-84	0.00
P-2	1.43	P-6	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	56.47	P-126	0.00
P-255	18.66	P-5	0.00
P-27	18.58	P-60	0.00
P-154	17.59	P-84	0.00
P-35	16.16	P-271	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	31.52	P-126	0.00
P-255	18.66	P-5	0.00
P-27	18.50	P-60	0.00
P-154	17.53	P-84	0.00
P-35	16.14	P-271	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
PR-1	661.10	PR-1

NET SYSTEM INFLOW = 661.10
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 661.10

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FireFlow/Hydrant Report

Fireflow/Hydrant Report:

Specified Minimum Pressure(psi or kPa): 20.0
Minimum Static Pressure(psi or kPa) : 20.0
Sp.Min Pres@FirePump Suctn(psi or kPa): 0.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2
Flow-3: Flowrate to maintain the specified pressure at Fire Pump Suction
(Flow-3 is based on combined value of hydrant and hose constants)

Hose Constant = 0.00

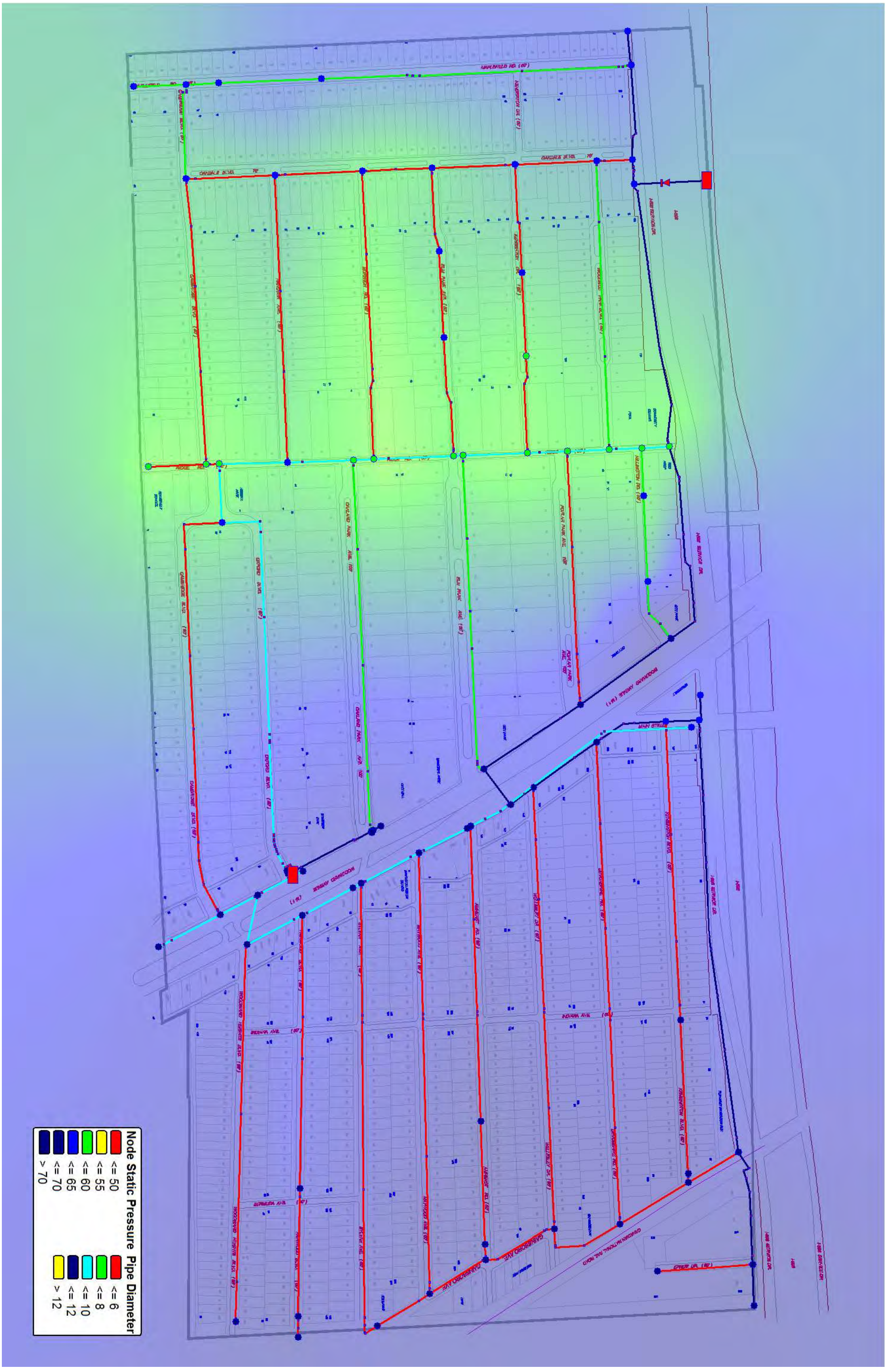
Hydrant Node	Hydrant Constant	Elevation	Demand gpm	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2
J-1	0.0	646.9	8.3	66.5	2808.0	2492.4	J-19
J-10	0.0	665.6	10.2	56.4	890.3	878.6	J-19
J-11	0.0	666.8	0.8	55.8	444.3		
J-12	0.0	666.4	1.7	56.5	1259.1	1172.0	J-19
J-13	0.0	650.8	13.6	64.1	1843.8		
J-14	0.0	663.7	26.3	57.9	1374.4	1285.9	J-19
J-15	0.0	660.9	15.8	49.3	372.5	343.0	J-19
J-16	0.0	659.2	18.0	50.2	382.3	349.6	J-19
J-17	0.0	663.2	12.4	57.9	1265.9	1167.3	J-19
J-18	0.0	662.6	15.8	47.5	322.3	318.5	J-19
J-19	0.0	668.3	9.4	44.6	292.7		
J-2	0.0	648.1	2.0	66.0	2688.4	2486.1	J-19
J-20	0.0	657.9	8.9	49.1	334.2	304.6	J-19
J-21	0.0	657.5	6.4	49.3	344.5	302.6	J-19
J-22	0.0	658.3	9.4	49.0	314.3	305.6	J-19
J-23	0.0	662.3	9.1	47.3	302.4		
J-24	0.0	664.9	3.3	46.1	306.8	293.2	J-19
J-25	0.0	665.9	2.5	45.6	303.2	295.2	J-19
J-26	0.0	666.1	9.1	56.8	1225.9	1223.7	J-19
J-27	0.0	665.0	7.7	46.0	311.3	298.2	J-19
J-28	0.0	665.9	6.4	45.7	308.2	300.3	J-19
J-29	0.0	664.9	4.7	46.1	311.3	299.7	J-19
J-3	0.0	648.4	0.0	66.9	53509.0	37596.5	J-19
J-30	0.0	665.8	1.4	45.7	305.0	296.9	J-19
J-31	0.0	642.1	1.1	56.0	397.1	296.7	J-19
J-32	0.0	651.8	5.5	51.8	364.3	301.2	J-19
J-33	0.0	649.8	6.9	52.6	373.3	303.3	J-19
J-34	0.0	645.4	0.0	54.5	347.0	298.3	J-19
J-35	0.0	640.8	1.8	56.5	357.0	300.0	J-19
J-36	0.0	665.8	8.7	45.7	313.3	304.5	J-19
J-37	0.0	650.5	20.3	52.3	380.6	318.2	J-19
J-38	0.0	648.2	16.4	62.4	883.8	841.3	J-39
J-39	0.0	655.0	0.0	59.4	606.1		
J-4	0.0	646.8	0.0	66.6	2817.3	2492.4	J-19
J-40	0.0	641.1	23.0	57.9	444.8	365.6	J-19
J-41	0.0	650.6	23.3	52.3	385.8	320.5	J-19
J-42	0.0	642.9	0.8	59.8	512.7	434.5	J-19
J-43	0.0	648.4	22.8	62.4	972.3	876.9	J-19
J-44	0.0	640.7	18.5	61.8	546.3	508.0	J-19
J-45	0.0	655.6	0.3	50.2	345.5	296.8	J-19
J-46	0.0	658.0	9.4	49.1	345.5	305.6	J-19
J-47	0.0	641.4	0.0	56.3	351.2	298.3	J-19

J-48	0.0	642.2	0.0	55.9	253.3		
J-49	0.0	643.2	17.7	61.0	469.3		
J-5	0.0	642.7	18.8	56.2	368.2	344.6	J-19
J-50	0.0	661.0	4.1	47.8	323.1	299.8	J-19
J-51	0.0	648.0	12.7	66.3	5038.5	3477.3	J-19
J-52	0.0	654.9	14.4	50.4	354.7	312.7	J-19
J-53	0.0	655.3	0.0	50.2	336.6	298.3	J-19
J-54	0.0	653.0	0.0	51.2	343.7	298.3	J-19
J-55	0.0	650.6	0.0	52.3	362.9	296.9	J-19
J-56	0.0	646.8	18.2	63.4	1098.1	960.3	J-19
J-59	0.0	649.5	1.6	64.6	2366.0	1990.3	J-19
J-6	0.0	643.5	0.0	55.6	300.3		
J-60	0.0	648.0	0.0	66.1	3912.4	2915.4	J-19
J-61	0.0	649.0	14.4	63.1	1284.4	1132.4	J-19
J-62	0.0	643.0	0.6	65.2	199.6		
J-63	0.0	648.2	0.0	65.2	1379.9		
J-64	0.0	647.7	20.6	64.6	1677.2	1447.7	J-19
J-65	0.0	642.2	18.9	66.5	237.1		
J-66	0.0	646.8	0.0	66.6	2241.3		
J-68	0.0	648.0	0.0	66.1	3046.6	2915.4	J-19
J-69	0.0	663.0	4.4	46.9	316.0	300.1	J-19
J-7	0.0	658.6	6.6	49.9	361.3	325.5	J-19
J-70	0.0	648.0	0.0	66.2	4457.5	3124.4	J-19
J-71	0.0	665.0	3.9	46.0	258.7		
J-72	0.0	662.0	5.0	47.3	264.9		
J-73	0.0	657.0	6.4	50.5	364.5	322.9	J-19
J-74	0.0	654.0	18.3	51.5	380.4	328.6	J-19
J-75	0.0	663.0	5.3	46.9	264.3		
J-76	0.0	661.0	5.0	47.8	272.1		
J-77	0.0	648.0	0.0	62.5	873.5	829.7	J-39
J-78	0.0	647.0	0.0	63.4	1103.8	963.6	J-19
J-79	0.0	641.0	6.6	66.1	212.8	210.5	J-62
J-8	0.0	654.1	14.7	50.8	366.2	311.2	J-19
J-80	0.0	648.0	17.4	63.1	256.5		
J-81	0.0	641.0	7.5	60.7	505.5	448.9	J-19
J-82	0.0	640.0	20.2	62.1	458.2		
J-83	0.0	642.0	9.7	56.2	310.6		
J-84	0.0	644.0	24.1	55.1	295.4		
J-9	0.0	659.9	2.2	49.4	339.9	321.0	J-19

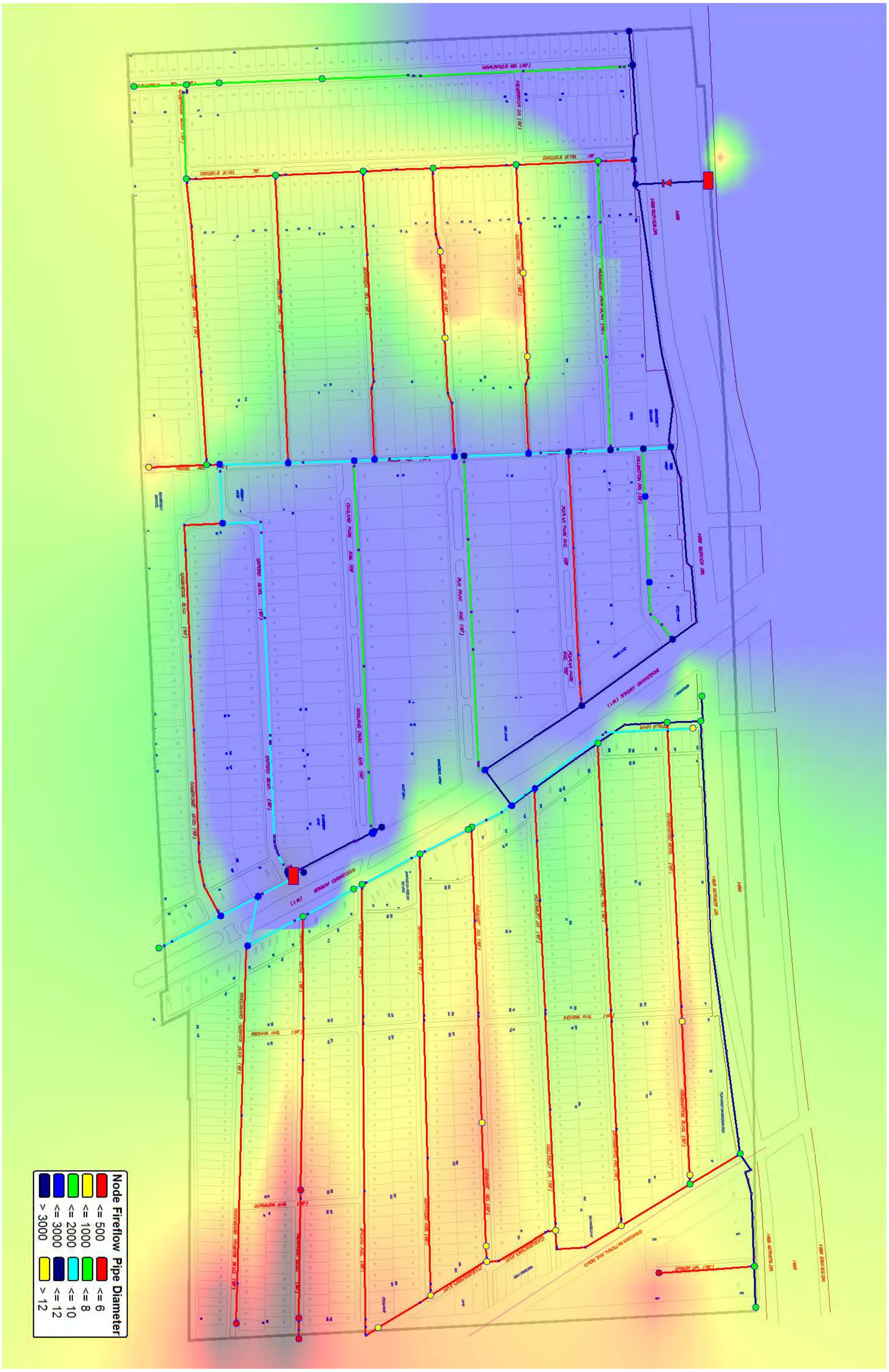
APPENDIX F

Interim Improvements Water Distribution System; Existing Maximum Day Demand Results

Includes:
Static Pressure Gradient Map; Interim Improvements, Existing Maximum Day Demand
Available Fire Flow Gradient Map; Interim Improvements, Existing Max. Day Demand
Computer Model Simulation; Interim Improvements, Existing Maximum Day Demand



Static Pressure; Interim Improvements; Existing Maximum Day Demand



Available Fire Flow; Interim Improvements; Existing Maximum Day Demand

```
* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 7.022a  07/08/2015                              *
*  Serial #:  6-5116761                                     *
*  Interface:  Classic                                      *
*  Licensed for Pipe2014                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 Date & Time:  Wed Jan 13 10:52:17 2016

 Master File : m:\0175\0175-0095\gen\reports\kypipe\import\socwa
revision\watermodelinterim.KYP\watermodelinterim.P2K
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SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.14	36.7906	0.00
P-10	J-75	J-24	557.86	6.08	34.1420	1.27
P-103	J-38	J-82	1375.77	6.08	34.1420	1.54
P-107	J-43	J-44	2058.36	6.08	34.1420	1.37
P-11	J-76	J-75	402.54	6.08	34.1420	0.40
P-12	J-77	J-38	19.18	10.16	34.1420	0.17
P-120	J-31	J-36	972.64	12.34	78.7632	2.37
P-125	J-8	J-21	445.59	12.34	78.7632	0.70
P-126	J-45	J-8	160.81	12.34	78.7632	0.00
P-13	J-5	J-6	373.36	6.08	34.1420	0.00
P-130	J-36	J-46	1250.08	12.34	78.7632	1.79
P-14	J-78	J-61	266.57	10.16	34.1420	0.17
P-148	J-47	J-35	190.47	12.14	36.7906	0.17
P-149	J-27	J-33	1489.24	8.18	52.6781	2.98
P-15	J-79	J-80	597.22	6.08	34.1420	0.57
P-152	J-48	J-35	445.75	6.08	34.1420	0.57
P-154	J-42	J-40	362.71	6.08	34.1420	0.70
P-155	J-40	J-5	415.41	6.08	34.1420	1.27
P-156	J-6	J-34	275.42	6.08	34.1420	0.17
P-157	J-53	J-54	124.93	12.14	36.7906	0.75
P-16	J-80	J-61	1275.42	6.08	34.1420	0.57
P-17	J-81	J-42	72.50	6.08	34.1420	0.17
P-170	J-33	J-55	209.02	12.14	36.7906	0.34

P-171	J-41	J-55	134.03	12.14	36.7906	0.00
P-172	J-37	J-41	362.21	12.14	36.7906	0.00
P-174	J-52	J-84	1394.38	6.08	34.1420	1.54
P-175	J-37	J-52	349.33	12.14	36.7906	0.69
P-178	J-44	J-42	304.86	6.08	34.1420	0.35
P-179	J-56	J-49	2164.85	6.08	34.1420	2.06
P-18	J-82	J-81	575.79	6.08	34.1420	0.57
P-188	J-26	J-1	1732.31	8.18	52.6781	1.89
P-189	J-43	J-77	250.49	10.16	34.1420	0.57
P-19	J-83	J-6	42.96	6.08	34.1420	0.17
P-191	J-14	J-51	1820.36	10.16	34.1420	2.81
P-192	J-59	J-60	171.60	10.16	34.1420	0.17
P-192a	J-60	J-68	67.12	10.16	34.1420	0.17
P-195	J-56	J-78	45.89	10.16	34.1420	0.40
P-197	J-56	J-43	304.88	10.16	34.1420	0.57
P-2	J-70	J-60	22.81	10.16	34.1420	0.00
P-20	J-7	J-73	152.54	8.18	52.6781	0.57
P-201	J-62	J-79	95.36	6.08	34.1420	0.57
P-209	J-13	J-63	324.39	10.16	34.1420	0.34
P-21	J-84	J-83	716.44	6.08	34.1420	0.40
P-210	J-59	J-13	198.02	10.16	34.1420	0.17
P-217	J-64	J-59	236.90	10.16	34.1420	0.17
P-219	J-64	J-65	1762.12	6.08	34.1420	1.49
P-22-CV	PR-2	J-46	339.46	12.34	78.7632	1.74
P-221	J-61	J-64	294.29	10.16	34.1420	0.17
P-239	J-12	J-14	275.83	10.16	34.1420	0.17
P-24	J-9	J-7	245.04	8.18	52.6781	0.17
P-243	J-16	J-18	408.03	6.08	34.1420	0.17
P-25	J-10	J-11	270.51	6.08	34.1420	0.00
P-255	J-51	J-70	16.36	10.16	34.1420	0.00
P-264	J-34	J-35	559.29	12.14	36.7906	1.62
P-265	J-44	J-49	287.63	6.08	34.1420	0.17
P-266	J-26	J-19	95.17	10.16	34.1420	0.00
P-268-CV	PR-1	J-3	17.14	12.34	93.5192	0.00
P-269	J-51	J-3	30.19	10.16	34.1420	7.09
P-27	J-12	J-10	61.27	6.08	34.1420	0.17
P-271	J-52	J-53	156.58	12.14	36.7906	0.00
P-272	J-66	J-4	8.87	6.08	34.1420	0.17
P-275	J-1	J-4	9.76	12.14	36.7906	0.00
P-285	J-53	J-34	2026.54	12.14	36.7906	0.34
P-286	J-46	J-21	116.24	12.34	78.7632	0.87
P-29	J-13	J-14	2021.68	6.08	34.1420	2.52
P-3	J-4	J-70	436.95	12.14	36.7906	0.70
P-31	J-15	J-10	1335.13	6.08	34.1420	1.14
P-32	J-15	J-7	455.35	8.18	52.6781	1.84
P-34	J-16	J-15	416.64	6.08	34.1420	0.17
P-35	J-16	J-17	1343.13	6.08	34.1420	1.14
P-38	J-18	J-19	1348.06	6.08	34.1420	1.84
P-4	J-50	J-31	303.86	8.18	52.6781	0.52
P-41	J-20	J-21	168.80	6.08	34.1420	0.34
P-44	J-22	J-20	381.01	6.08	34.1420	0.17
P-46	J-23	J-22	387.52	6.08	34.1420	0.00
P-48	J-18	J-23	325.49	6.08	34.1420	0.57
P-49	J-23	J-76	391.70	6.08	34.1420	1.27
P-5	J-69	J-50	401.89	8.18	52.6781	0.40
P-51	J-25	J-71	454.23	6.08	34.1420	1.27
P-55	J-17	J-12	318.63	10.16	34.1420	0.00

P-56	J-26	J-17	306.82	10.16	34.1420	0.00
P-57	J-24	J-19	373.15	10.16	34.1420	0.00
P-58	J-27	J-24	43.67	10.16	34.1420	0.00
P-6	J-71	J-72	388.95	6.08	34.1420	0.40
P-60	J-25	J-27	300.24	10.16	34.1420	0.17
P-61	J-28	J-25	187.57	10.16	34.1420	0.00
P-63	J-29	J-20	1346.63	8.18	52.6781	1.14
P-67	J-30	J-69	223.04	8.18	52.6781	0.57
P-69	J-31	J-32	521.13	12.14	36.7906	0.00
P-7	J-72	J-22	509.45	6.08	34.1420	0.87
P-71	J-33	J-32	543.94	12.14	36.7906	0.00
P-8	J-73	J-74	479.27	8.18	52.6781	0.40
P-81	J-29	J-28	196.49	10.16	34.1420	0.17
P-82	J-30	J-29	151.25	10.16	34.1420	0.00
P-83	J-36	J-30	129.33	10.16	34.1420	0.00
P-84	J-32	J-28	1184.63	6.08	34.1420	1.14
P-87	J-5	J-37	2251.87	6.08	34.1420	2.51
P-9	J-74	J-8	1448.13	8.18	52.6781	2.94
P-92	J-38	J-39	1173.25	10.16	34.1420	0.87
P-97	J-40	J-41	2063.01	6.08	34.1420	2.34

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		5.19	646.90	
J-10		6.40	665.57	
J-11		0.52	666.78	
J-12		1.04	666.41	
J-13		8.47	650.77	
J-14		16.42	663.73	
J-15		9.85	660.87	
J-16		11.24	659.23	
J-17		7.78	663.22	
J-18		9.85	662.56	
J-19		5.88	668.34	
J-2		1.25	648.06	
J-20		5.53	657.89	
J-21		3.98	657.51	
J-22		5.88	658.30	
J-23		5.70	662.32	
J-24		2.07	664.89	
J-25		1.56	665.93	
J-26		5.70	666.12	
J-27		4.84	665.03	
J-28		3.98	665.85	
J-29		2.94	664.95	
J-3		0.00	648.42	
J-30		0.86	665.84	
J-31		0.69	642.05	
J-32		3.46	651.80	
J-33		4.32	649.84	
J-34		0.00	645.38	
J-35		1.10	640.76	
J-36		5.44	665.80	

J-37		12.68	650.49	
J-38		10.27	648.18	
J-39		0.00	655.00	
J-4		0.00	646.84	
J-40		14.35	641.08	
J-41		14.57	650.63	
J-42		0.52	642.94	
J-43		14.26	648.38	
J-44		11.58	640.70	
J-45		0.17	655.58	
J-46	EC-SOCWA	5.88	658.00	
J-47	EC-Ferndale	0.00	641.36	
J-48		0.00	642.16	
J-49		11.06	643.24	
J-5		11.76	642.66	
J-50	1F	2.59	661.00	
J-51		7.95	648.00	
J-52		8.99	654.88	
J-53		0.00	655.33	
J-54		0.00	653.00	
J-55		0.00	650.63	
J-56		11.39	646.80	
J-59		0.99	649.53	
J-6		0.00	643.53	
J-60		0.00	648.00	
J-61		8.99	649.02	
J-62	EC-Ferndale	0.35	643.00	
J-63	EC-Ferndale	0.00	648.19	
J-64		12.90	647.71	
J-65		11.83	642.19	
J-66		0.00	646.83	
J-68		0.00	648.00	
J-69	1R	2.77	663.00	
J-7		4.15	658.64	
J-70		0.00	648.00	
J-71	2F	2.42	665.00	
J-72	2R	3.11	662.00	
J-73	3F	3.98	657.00	
J-74	3R	11.41	654.00	
J-75	4F	3.28	663.00	
J-76	4R	3.11	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	4.15	641.00	
J-8		9.16	654.08	
J-80	6F	10.89	648.00	
J-81	7R	4.67	641.00	
J-82	7F	12.62	640.00	
J-83	8F	6.05	642.00	
J-84	8R	15.04	644.00	
J-9		1.38	659.92	
PR-1	PR-1	----	648.00	802.77
PR-2	PR-2	----	658.00	802.72

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 100
NUMBER OF END NODES .....(J) = 81
NUMBER OF PRIMARY LOOPS .....(L) = 18
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 10 TRIALS: ACCURACY = 0.35743E-03

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

Revised Interim Improvements System with Second
SOCWA Supply; Existing Maximum Day Demand

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	1.25	0.00	0.00	0.00	0.00	0.00
P-10	J-75	J-24	-6.83	0.04	0.00	0.08	0.08	0.08
P-103	J-38	J-82	10.17	0.23	0.00	0.11	0.17	0.17
P-107	J-43	J-44	8.44	0.25	0.00	0.09	0.12	0.12
P-11	J-76	J-75	-3.54	0.01	0.00	0.04	0.02	0.02
P-12	J-77	J-38	20.43	0.00	0.00	0.08	0.05	0.05
P-120	J-31	J-36	-72.69	0.04	0.00	0.19	0.05	0.04
P-125	J-8	J-21	-44.46	0.01	0.00	0.12	0.02	0.02
P-126	J-45	J-8	-0.17	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	-14.19	0.12	0.00	0.16	0.31	0.31
P-130	J-36	J-46	-128.18	0.16	0.00	0.34	0.13	0.12
P-14	J-78	J-61	-63.81	0.11	0.00	0.25	0.42	0.42
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	22.94	0.12	0.00	0.14	0.08	0.08
P-15	J-79	J-80	-4.49	0.02	0.00	0.05	0.04	0.04
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	-12.55	0.09	0.00	0.14	0.25	0.25
P-155	J-40	J-5	-13.23	0.11	0.00	0.15	0.28	0.27
P-156	J-6	J-34	-23.66	0.22	0.00	0.26	0.81	0.81
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-61	-15.39	0.46	0.00	0.17	0.36	0.36
P-17	J-81	J-42	-7.12	0.01	0.00	0.08	0.09	0.09
P-170	J-33	J-55	97.08	0.07	0.00	0.27	0.33	0.33
P-171	J-41	J-55	-97.08	0.04	0.00	0.27	0.33	0.33
P-172	J-37	J-41	-68.84	0.06	0.00	0.19	0.17	0.17
P-174	J-52	J-84	11.63	0.30	0.00	0.13	0.22	0.22
P-175	J-37	J-52	45.37	0.03	0.00	0.13	0.08	0.08

P-178	J-44	J-42	-4.91	0.01	0.00	0.05	0.04	0.04
P-179	J-56	J-49	9.29	0.31	0.00	0.10	0.14	0.14
P-18	J-82	J-81	-2.45	0.01	0.00	0.03	0.01	0.01
P-188	J-26	J-1	-30.20	0.23	0.00	0.18	0.13	0.13
P-189	J-43	J-77	20.43	0.01	0.00	0.08	0.05	0.05
P-19	J-83	J-6	-9.46	0.01	0.00	0.10	0.15	0.15
P-191	J-14	J-51	-37.24	0.28	0.00	0.15	0.15	0.15
P-192	J-59	J-60	-120.24	0.23	0.00	0.48	1.35	1.34
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-63.81	0.02	0.00	0.25	0.42	0.42
P-197	J-56	J-43	43.13	0.06	0.00	0.17	0.20	0.20
P-2	J-70	J-60	120.24	0.03	0.00	0.48	1.34	1.34
P-20	J-7	J-73	-19.74	0.01	0.00	0.12	0.06	0.06
P-201	J-62	J-79	-0.35	0.00	0.00	0.00	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	-3.41	0.02	0.00	0.04	0.02	0.02
P-210	J-59	J-13	6.34	0.00	0.00	0.03	0.01	0.01
P-217	J-64	J-59	-112.91	0.28	0.00	0.45	1.20	1.19
P-219	J-64	J-65	11.83	0.39	0.00	0.13	0.22	0.22
P-22-CV	PR-2	J-46	211.11	0.11	0.01	0.57	0.34	0.31
P-221	J-61	J-64	-88.18	0.22	0.00	0.35	0.76	0.76
P-239	J-12	J-14	-18.69	0.01	0.00	0.07	0.04	0.04
P-24	J-9	J-7	-1.38	0.00	0.00	0.01	0.00	0.00
P-243	J-16	J-18	1.30	0.00	0.00	0.01	0.00	0.00
P-25	J-10	J-11	0.52	0.00	0.00	0.01	0.00	0.00
P-255	J-51	J-70	156.88	0.04	0.00	0.62	2.20	2.20
P-264	J-34	J-35	1.10	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	1.77	0.00	0.00	0.02	0.01	0.01
P-266	J-26	J-19	19.27	0.00	0.00	0.08	0.05	0.05
P-268-CV	PR-1	J-3	202.07	0.00	0.00	0.54	0.21	0.21
P-269	J-51	J-3	-202.07	0.11	0.07	0.80	5.84	3.51
P-27	J-12	J-10	9.83	0.01	0.00	0.11	0.16	0.16
P-271	J-52	J-53	24.76	0.00	0.00	0.07	0.03	0.03
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-36.64	0.00	0.00	0.10	0.05	0.05
P-285	J-53	J-34	24.76	0.05	0.00	0.07	0.03	0.03
P-286	J-46	J-21	77.06	0.01	0.00	0.21	0.05	0.05
P-29	J-13	J-14	-2.13	0.02	0.00	0.02	0.01	0.01
P-3	J-4	J-70	-36.64	0.02	0.00	0.10	0.05	0.05
P-31	J-15	J-10	-2.92	0.02	0.00	0.03	0.02	0.02
P-32	J-15	J-7	-14.20	0.02	0.00	0.09	0.03	0.03
P-34	J-16	J-15	-7.27	0.04	0.00	0.08	0.09	0.09
P-35	J-16	J-17	-5.27	0.07	0.00	0.06	0.05	0.05
P-38	J-18	J-19	-5.19	0.07	0.00	0.06	0.05	0.05
P-4	J-50	J-31	4.91	0.00	0.00	0.03	0.00	0.00
P-41	J-20	J-21	-28.63	0.19	0.00	0.32	1.15	1.15
P-44	J-22	J-20	-14.35	0.12	0.00	0.16	0.32	0.32
P-46	J-23	J-22	-8.64	0.05	0.00	0.10	0.12	0.12
P-48	J-18	J-23	-3.37	0.01	0.00	0.04	0.02	0.02
P-49	J-23	J-76	-0.43	0.00	0.00	0.00	0.00	0.00
P-5	J-69	J-50	7.50	0.00	0.00	0.05	0.01	0.01
P-51	J-25	J-71	5.71	0.03	0.00	0.06	0.06	0.06
P-55	J-17	J-12	-7.82	0.00	0.00	0.03	0.01	0.01
P-56	J-26	J-17	5.22	0.00	0.00	0.02	0.00	0.00
P-57	J-24	J-19	-8.21	0.00	0.00	0.03	0.01	0.01
P-58	J-27	J-24	0.69	0.00	0.00	0.00	0.00	0.00
P-6	J-71	J-72	3.29	0.01	0.00	0.04	0.02	0.02

P-60	J-25	J-27	28.47	0.03	0.00	0.11	0.09	0.09
P-61	J-28	J-25	35.73	0.03	0.00	0.14	0.14	0.14
P-63	J-29	J-20	-8.75	0.02	0.00	0.05	0.01	0.01
P-67	J-30	J-69	10.27	0.00	0.00	0.06	0.02	0.02
P-69	J-31	J-32	76.91	0.11	0.00	0.21	0.21	0.21
P-7	J-72	J-22	0.17	0.00	0.00	0.00	0.00	0.00
P-71	J-33	J-32	-78.46	0.12	0.00	0.22	0.22	0.22
P-8	J-73	J-74	-23.71	0.04	0.00	0.14	0.09	0.09
P-81	J-29	J-28	44.72	0.04	0.00	0.18	0.22	0.21
P-82	J-30	J-29	38.92	0.03	0.00	0.15	0.17	0.17
P-83	J-36	J-30	50.05	0.03	0.00	0.20	0.26	0.26
P-84	J-32	J-28	-5.02	0.05	0.00	0.06	0.05	0.05
P-87	J-5	J-37	-10.79	0.42	0.00	0.12	0.19	0.19
P-9	J-74	J-8	-35.12	0.26	0.00	0.21	0.18	0.18
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-41	-13.67	0.60	0.00	0.15	0.29	0.29

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		5.19	802.53	646.90	155.63	67.44
J-10		6.40	802.29	665.57	136.71	59.24
J-11		0.52	802.29	666.78	135.51	58.72
J-12		1.04	802.30	666.41	135.89	58.89
J-13		8.47	802.29	650.77	151.53	65.66
J-14		16.42	802.31	663.73	138.58	60.05
J-15		9.85	802.27	660.87	141.40	61.27
J-16		11.24	802.23	659.23	143.00	61.97
J-17		7.78	802.30	663.22	139.08	60.27
J-18		9.85	802.23	662.56	139.66	60.52
J-19		5.88	802.29	668.34	133.95	58.05
J-2		1.25	802.53	648.06	154.47	66.94
J-20		5.53	802.40	657.89	144.51	62.62
J-21		3.98	802.60	657.51	145.09	62.87
J-22		5.88	802.28	658.30	143.98	62.39
J-23		5.70	802.23	662.32	139.91	60.63
J-24		2.07	802.29	664.89	137.40	59.54
J-25		1.56	802.32	665.93	136.38	59.10
J-26		5.70	802.30	666.12	136.18	59.01
J-27		4.84	802.29	665.03	137.26	59.48
J-28		3.98	802.34	665.85	136.49	59.15
J-29		2.94	802.39	664.95	137.44	59.56
J-3		0.00	802.77	648.42	154.34	66.88
J-30		0.86	802.41	665.84	136.57	59.18
J-31		0.69	802.40	642.05	160.35	69.49
J-32		3.46	802.29	651.80	150.49	65.21
J-33		4.32	802.17	649.84	152.33	66.01
J-34		0.00	801.91	645.38	156.53	67.83
J-35		1.10	801.91	640.76	161.14	69.83
J-36		5.44	802.45	665.80	136.65	59.21
J-37		12.68	801.99	650.49	151.50	65.65
J-38		10.27	801.58	648.18	153.40	66.48
J-39		0.00	801.58	655.00	146.58	63.52
J-4		0.00	802.53	646.84	155.69	67.46

J-40		14.35	801.45	641.08	160.38	69.50
J-41		14.57	802.05	650.63	151.43	65.62
J-42		0.52	801.36	642.94	158.42	68.65
J-43		14.26	801.59	648.38	153.22	66.39
J-44		11.58	801.35	640.70	160.65	69.62
J-45		0.17	802.59	655.58	147.01	63.71
J-46	EC-SOCWA	5.88	802.60	658.00	144.60	62.66
J-47	EC-Ferndale	0.00	801.91	641.36	160.54	69.57
J-48		0.00	801.91	642.16	159.74	69.22
J-49		11.06	801.35	643.24	158.10	68.51
J-5		11.76	801.57	642.66	158.90	68.86
J-50	1F	2.59	802.40	661.00	141.40	61.27
J-51		7.95	802.59	648.00	154.59	66.99
J-52		8.99	801.96	654.88	147.08	63.73
J-53		0.00	801.96	655.33	146.63	63.54
J-54		0.00	801.96	653.00	148.96	64.55
J-55		0.00	802.10	650.63	151.47	65.64
J-56		11.39	801.66	646.80	154.86	67.11
J-59		0.99	802.29	649.53	152.76	66.20
J-6		0.00	801.68	643.53	158.15	68.53
J-60		0.00	802.52	648.00	154.52	66.96
J-61		8.99	801.79	649.02	152.76	66.20
J-62	EC-Ferndale	0.35	801.30	643.00	158.30	68.60
J-63	EC-Ferndale	0.00	802.29	648.19	154.10	66.78
J-64		12.90	802.01	647.71	154.30	66.86
J-65		11.83	801.62	642.19	159.42	69.08
J-66		0.00	802.53	646.83	155.70	67.47
J-68		0.00	802.52	648.00	154.52	66.96
J-69	1R	2.77	802.41	663.00	139.41	60.41
J-7		4.15	802.28	658.64	143.64	62.24
J-70		0.00	802.55	648.00	154.55	66.97
J-71	2F	2.42	802.29	665.00	137.29	59.49
J-72	2R	3.11	802.28	662.00	140.28	60.79
J-73	3F	3.98	802.29	657.00	145.29	62.96
J-74	3R	11.41	802.33	654.00	148.33	64.28
J-75	4F	3.28	802.24	663.00	139.24	60.34
J-76	4R	3.11	802.23	661.00	141.23	61.20
J-77	5F	0.00	801.58	648.00	153.58	66.55
J-78	5R	0.00	801.68	647.00	154.68	67.03
J-79	6R	4.15	801.30	641.00	160.30	69.46
J-8		9.16	802.59	654.08	148.51	64.36
J-80	6F	10.89	801.32	648.00	153.32	66.44
J-81	7R	4.67	801.36	641.00	160.36	69.49
J-82	7F	12.62	801.35	640.00	161.35	69.92
J-83	8F	6.05	801.68	642.00	159.68	69.19
J-84	8R	15.04	801.66	644.00	157.66	68.32
J-9		1.38	802.28	659.92	142.36	61.69
PR-1	PR-1	----	802.77	648.00	154.77	67.07
PR-2	PR-2	----	802.72	658.00	144.72	62.71

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi

J-82	69.92	J-19	58.05
J-35	69.83	J-11	58.72
J-44	69.62	J-12	58.89
J-47	69.57	J-26	59.01
J-40	69.50	J-25	59.10

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	0.80	P-126	0.00
P-255	0.62	P-7	0.00
P-22	0.57	P-58	0.00
P-268	0.54	P-264	0.00
P-192	0.48	P-1	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	5.84	P-126	0.00
P-255	2.20	P-264	0.00
P-192	1.35	P-7	0.00
P-2	1.34	P-58	0.00
P-217	1.20	P-1	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	3.51	P-126	0.00
P-255	2.20	P-264	0.00
P-192	1.34	P-7	0.00
P-2	1.34	P-58	0.00
P-217	1.19	P-1	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
PR-1	202.07	PR-1
PR-2	211.11	PR-2

NET SYSTEM INFLOW = 413.19
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 413.19

==========

FireFlow/Hydrant Report

Fireflow/Hydrant Report:

Specified Minimum Pressure(psi or kPa): 20.0
Minimum Static Pressure(psi or kPa) : 20.0
Sp.Min Pres@FirePump Suctn(psi or kPa): 0.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2
Flow-3: Flowrate to maintain the specified pressure at Fire Pump Suction
(Flow-3 is based on combined value of hydrant and hose constants)

Hose Constant = 0.00

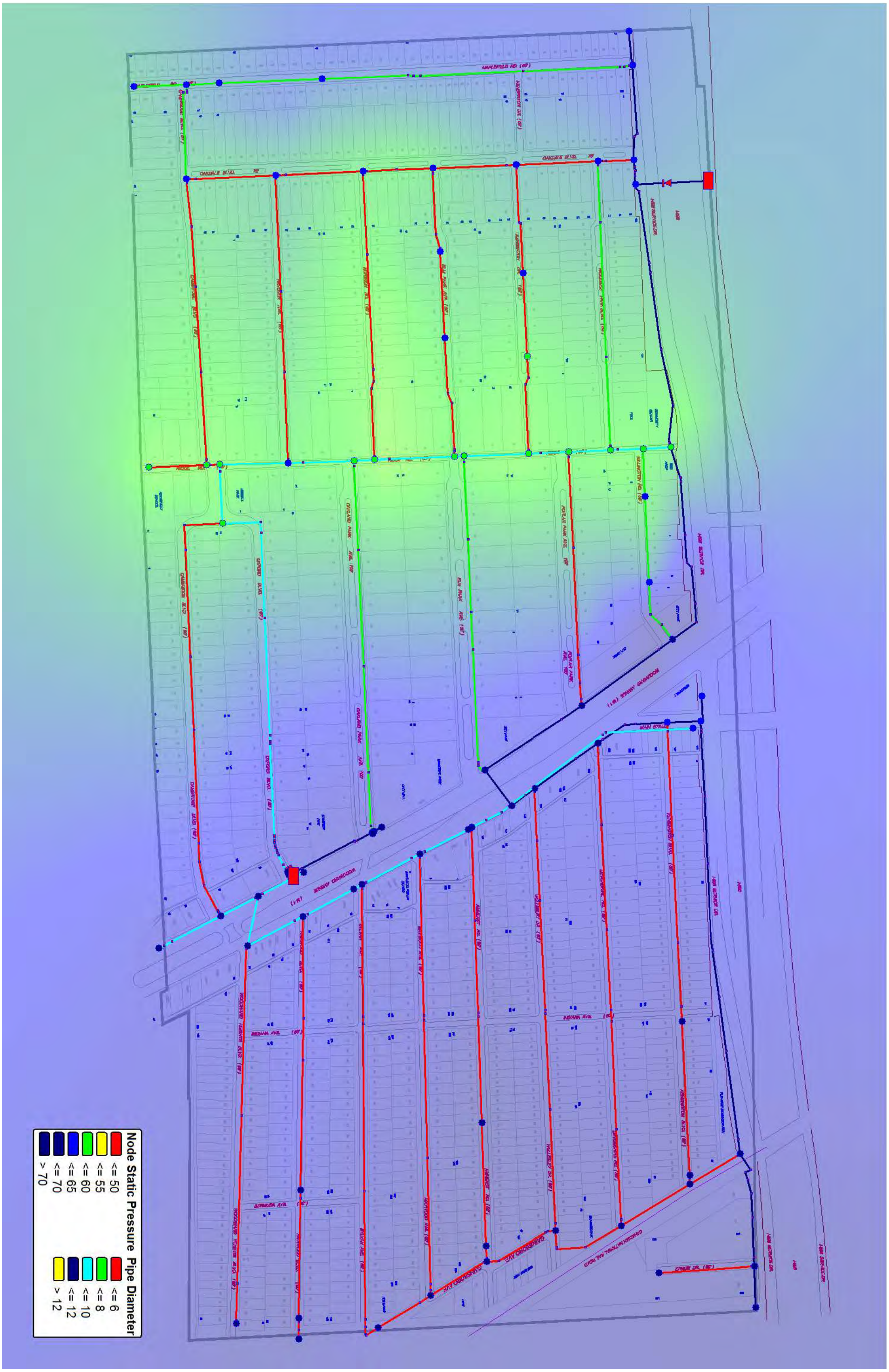
Hydrant Node	Hydrant Constant	Elevation	Demand gpm	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2
J-1	0.0	646.9	5.2	67.4	3506.6	3486.3	J-2
J-10	0.0	665.6	6.4	59.2	1329.1	1319.4	J-11
J-11	0.0	666.8	0.5	58.7	539.3		
J-12	0.0	666.4	1.0	58.9	2276.1		
J-13	0.0	650.8	8.5	65.7	2190.3		
J-14	0.0	663.7	16.4	60.1	2188.6		
J-15	0.0	660.9	9.9	61.3	1220.2		
J-16	0.0	659.2	11.2	62.0	1052.8		
J-17	0.0	663.2	7.8	60.3	2522.8		
J-18	0.0	662.6	9.9	60.5	1028.3		
J-19	0.0	668.3	5.9	58.0	2793.0		
J-2	0.0	648.1	1.2	66.9	3320.2		
J-20	0.0	657.9	5.5	62.6	1985.4		
J-21	0.0	657.5	4.0	62.9	7562.9		
J-22	0.0	658.3	5.9	62.4	1129.2		
J-23	0.0	662.3	5.7	60.6	1041.2		
J-24	0.0	664.9	2.1	59.5	2988.7		
J-25	0.0	665.9	1.6	59.1	2901.1		
J-26	0.0	666.1	5.7	59.0	2866.3		
J-27	0.0	665.0	4.8	59.5	3040.3		
J-28	0.0	665.9	4.0	59.1	3044.9		
J-29	0.0	664.9	2.9	59.6	3466.2		
J-3	0.0	648.4	0.0	66.9	54007.3		
J-30	0.0	665.8	0.9	59.2	3870.7		
J-31	0.0	642.1	0.7	69.5	4386.5	4243.7	J-50
J-32	0.0	651.8	3.5	65.2	3155.4		
J-33	0.0	649.8	4.3	66.0	2716.7	2646.8	J-53
J-34	0.0	645.4	0.0	67.8	1287.8		
J-35	0.0	640.8	1.1	69.8	1188.9	1180.8	J-48
J-36	0.0	665.8	5.4	59.2	4719.3		
J-37	0.0	650.5	12.7	65.6	1951.7	1902.6	J-53
J-38	0.0	648.2	10.3	66.5	1161.3	1118.6	J-39
J-39	0.0	655.0	0.0	63.5	759.5		
J-4	0.0	646.8	0.0	67.5	3524.9	3505.7	J-2
J-40	0.0	641.1	14.3	69.5	951.7		
J-41	0.0	650.6	14.6	65.6	2264.9	2210.8	J-53

J-42	0.0	642.9	0.5	68.7	867.9		
J-43	0.0	648.4	14.3	66.4	1289.1	1245.1	J-39
J-44	0.0	640.7	11.6	69.6	781.4		
J-45	0.0	655.6	0.2	63.7	4808.4		
J-46	0.0	658.0	5.9	62.7	8996.9	8805.1	J-36
J-47	0.0	641.4	0.0	69.6	1148.3		
J-48	0.0	642.2	0.0	69.2	469.3		
J-49	0.0	643.2	11.1	68.5	620.0		
J-5	0.0	642.7	11.8	68.9	961.4		
J-50	0.0	661.0	2.6	61.3	2592.6		
J-51	0.0	648.0	8.0	67.0	6949.0	6866.2	J-39
J-52	0.0	654.9	9.0	63.7	1698.6	1695.2	J-53
J-53	0.0	655.3	0.0	63.5	1615.2		
J-54	0.0	653.0	0.0	64.5	1568.8		
J-55	0.0	650.6	0.0	65.6	2396.0	2340.7	J-53
J-56	0.0	646.8	11.4	67.1	1465.8	1409.1	J-39
J-59	0.0	649.5	1.0	66.2	3016.3	2988.9	J-39
J-6	0.0	643.5	0.0	68.5	1022.3		
J-60	0.0	648.0	0.0	67.0	5240.0	5174.2	J-39
J-61	0.0	649.0	9.0	66.2	1684.0	1650.9	J-39
J-62	0.0	643.0	0.3	68.6	220.2		
J-63	0.0	648.2	0.0	66.8	1557.0		
J-64	0.0	647.7	12.9	66.9	2140.0	2095.1	J-39
J-65	0.0	642.2	11.8	69.1	248.0		
J-66	0.0	646.8	0.0	67.5	2618.3		
J-68	0.0	648.0	0.0	67.0	3676.3		
J-69	0.0	663.0	2.8	60.4	2680.8		
J-7	0.0	658.6	4.1	62.2	1244.2	1235.1	J-9
J-70	0.0	648.0	0.0	67.0	6162.8	6076.3	J-39
J-71	0.0	665.0	2.4	59.5	735.1		
J-72	0.0	662.0	3.1	60.8	708.0		
J-73	0.0	657.0	4.0	63.0	1268.7		
J-74	0.0	654.0	11.4	64.3	1372.6		
J-75	0.0	663.0	3.3	60.3	710.7		
J-76	0.0	661.0	3.1	61.2	721.5		
J-77	0.0	648.0	0.0	66.6	1159.7	1115.8	J-39
J-78	0.0	647.0	0.0	67.0	1481.6	1427.2	J-39
J-79	0.0	641.0	4.1	69.5	231.9	229.7	J-62
J-8	0.0	654.1	9.2	64.4	5355.6	5312.5	J-45
J-80	0.0	648.0	10.9	66.4	278.6		
J-81	0.0	641.0	4.7	69.5	798.1		
J-82	0.0	640.0	12.6	69.9	603.4		
J-83	0.0	642.0	6.1	69.2	942.2		
J-84	0.0	644.0	15.0	68.3	597.9		
J-9	0.0	659.9	1.4	61.7	1053.3		

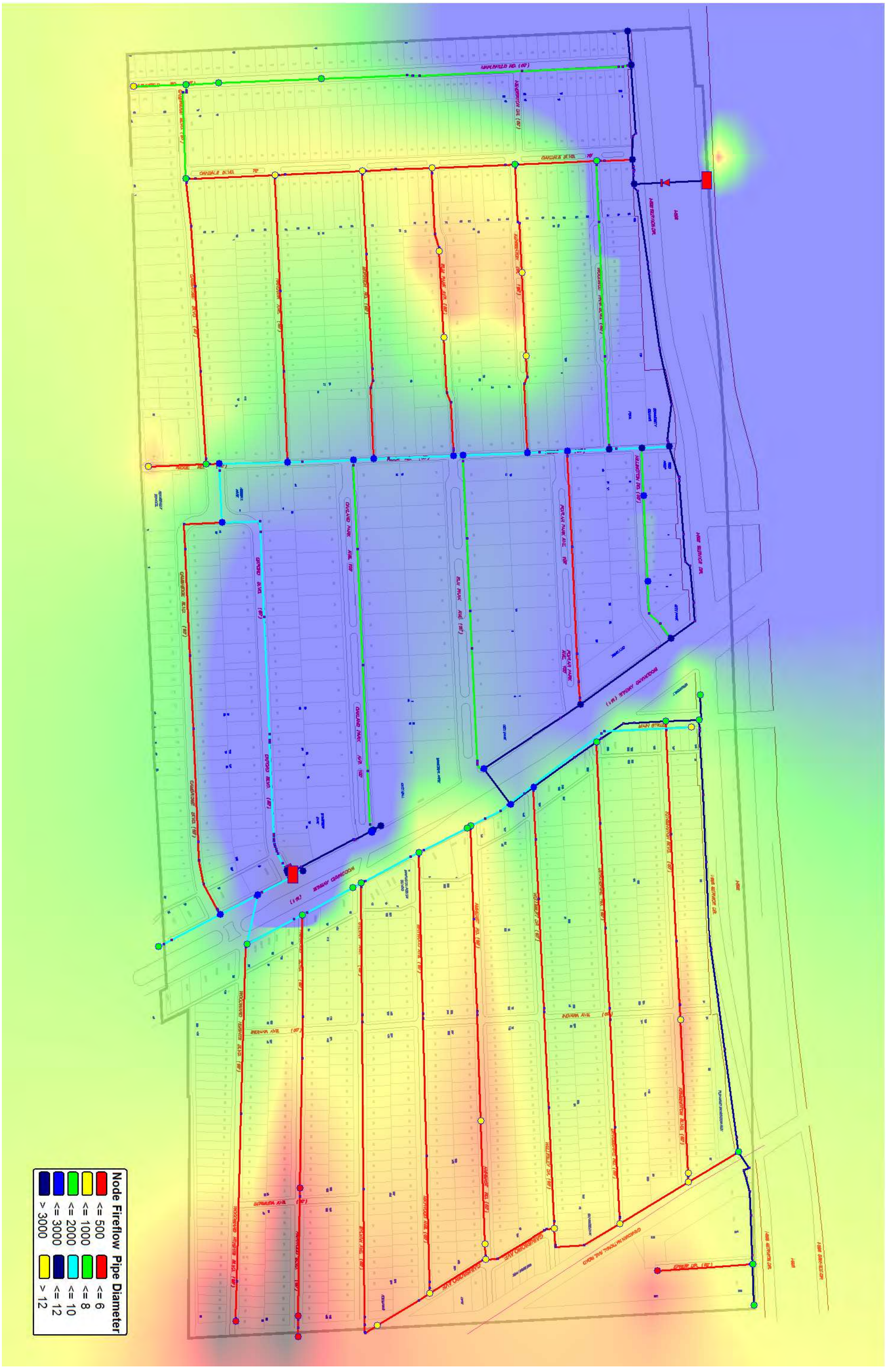
APPENDIX G

Interim Improvements Water Distribution System; 2035 Maximum Day Demand Results

Includes:
Static Pressures Gradient Map; Interim Improvements, 2035 Maximum Day Demand
Available Fire Flow Gradient Map; Interim Improvements, 2035 Max. Day Demand
Computer Model Simulation; Interim Improvements, 2035 Maximum Day Demand



Static Pressure; Interim Improvements; 2035 Maximum Day Demand



Available Fire Flow; Interim Improvements; 2035 Maximum Day Demand

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*                                                           *
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*  Serial #:  6-5116761                                     *
*  Interface:  Classic                                      *
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 Date & Time:  Wed Jan 13 11:53:43 2016

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SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.14	34.9545	0.00
P-10	J-75	J-24	557.86	6.08	32.4385	1.27
P-103	J-38	J-82	1375.77	6.08	32.4385	1.54
P-107	J-43	J-44	2058.36	6.08	32.4385	1.37
P-11	J-76	J-75	402.54	6.08	32.4385	0.40
P-12	J-77	J-38	19.18	10.16	32.4385	0.17
P-120	J-31	J-36	972.64	12.34	76.3750	2.37
P-125	J-8	J-21	445.59	12.34	76.3750	0.70
P-126	J-45	J-8	160.81	12.34	76.3750	0.00
P-13	J-5	J-6	373.36	6.08	32.4385	0.00
P-130	J-36	J-46	1250.08	12.34	76.3750	1.79
P-14	J-78	J-61	266.57	10.16	32.4385	0.17
P-148	J-47	J-35	190.47	12.14	34.9545	0.17
P-149	J-27	J-33	1489.24	8.18	50.0471	2.98
P-15	J-79	J-80	597.22	6.08	32.4385	0.57
P-152	J-48	J-35	445.75	6.08	32.4385	0.57
P-154	J-42	J-40	362.71	6.08	32.4385	0.70
P-155	J-40	J-5	415.41	6.08	32.4385	1.27
P-156	J-6	J-34	275.42	6.08	32.4385	0.17
P-157	J-53	J-54	124.93	12.14	34.9545	0.75
P-16	J-80	J-61	1275.42	6.08	32.4385	0.57
P-17	J-81	J-42	72.50	6.08	32.4385	0.17
P-170	J-33	J-55	209.02	12.14	34.9545	0.34

P-171	J-41	J-55	134.03	12.14	34.9545	0.00
P-172	J-37	J-41	362.21	12.14	34.9545	0.00
P-174	J-52	J-84	1394.38	6.08	32.4385	1.54
P-175	J-37	J-52	349.33	12.14	34.9545	0.69
P-178	J-44	J-42	304.86	6.08	32.4385	0.35
P-179	J-56	J-49	2164.85	6.08	32.4385	2.06
P-18	J-82	J-81	575.79	6.08	32.4385	0.57
P-188	J-26	J-1	1732.31	8.18	50.0471	1.89
P-189	J-43	J-77	250.49	10.16	32.4385	0.57
P-19	J-83	J-6	42.96	6.08	32.4385	0.17
P-191	J-14	J-51	1820.36	10.16	32.4385	2.81
P-192	J-59	J-60	171.60	10.16	32.4385	0.17
P-192a	J-60	J-68	67.12	10.16	32.4385	0.17
P-195	J-56	J-78	45.89	10.16	32.4385	0.40
P-197	J-56	J-43	304.88	10.16	32.4385	0.57
P-2	J-70	J-60	22.81	10.16	32.4385	0.00
P-20	J-7	J-73	152.54	8.18	50.0471	0.57
P-201	J-62	J-79	95.36	6.08	32.4385	0.57
P-209	J-13	J-63	324.39	10.16	32.4385	0.34
P-21	J-84	J-83	716.44	6.08	32.4385	0.40
P-210	J-59	J-13	198.02	10.16	32.4385	0.17
P-217	J-64	J-59	236.90	10.16	32.4385	0.17
P-219	J-64	J-65	1762.12	6.08	32.4385	1.49
P-22-CV	PR-2	J-46	339.46	12.34	76.3750	1.74
P-221	J-61	J-64	294.29	10.16	32.4385	0.17
P-239	J-12	J-14	275.83	10.16	32.4385	0.17
P-24	J-9	J-7	245.04	8.18	50.0471	0.17
P-243	J-16	J-18	408.03	6.08	32.4385	0.17
P-25	J-10	J-11	270.51	6.08	32.4385	0.00
P-255	J-51	J-70	16.36	10.16	32.4385	0.00
P-264	J-34	J-35	559.29	12.14	34.9545	1.62
P-265	J-44	J-49	287.63	6.08	32.4385	0.17
P-266	J-26	J-19	95.17	10.16	32.4385	0.00
P-268-CV	PR-1	J-3	17.14	12.34	91.1586	0.00
P-269	J-51	J-3	30.19	10.16	32.4385	7.09
P-27	J-12	J-10	61.27	6.08	32.4385	0.17
P-271	J-52	J-53	156.58	12.14	34.9545	0.00
P-272	J-66	J-4	8.87	6.08	32.4385	0.17
P-275	J-1	J-4	9.76	12.14	34.9545	0.00
P-285	J-53	J-34	2026.54	12.14	34.9545	0.34
P-286	J-46	J-21	116.24	12.34	76.3750	0.87
P-29	J-13	J-14	2021.68	6.08	32.4385	2.52
P-3	J-4	J-70	436.95	12.14	34.9545	0.70
P-31	J-15	J-10	1335.13	6.08	32.4385	1.14
P-32	J-15	J-7	455.35	8.18	50.0471	1.84
P-34	J-16	J-15	416.64	6.08	32.4385	0.17
P-35	J-16	J-17	1343.13	6.08	32.4385	1.14
P-38	J-18	J-19	1348.06	6.08	32.4385	1.84
P-4	J-50	J-31	303.86	8.18	50.0471	0.52
P-41	J-20	J-21	168.80	6.08	32.4385	0.34
P-44	J-22	J-20	381.01	6.08	32.4385	0.17
P-46	J-23	J-22	387.52	6.08	32.4385	0.00
P-48	J-18	J-23	325.49	6.08	32.4385	0.57
P-49	J-23	J-76	391.70	6.08	32.4385	1.27
P-5	J-69	J-50	401.89	8.18	50.0471	0.40
P-51	J-25	J-71	454.23	6.08	32.4385	1.27
P-55	J-17	J-12	318.63	10.16	32.4385	0.00

P-56	J-26	J-17	306.82	10.16	32.4385	0.00
P-57	J-24	J-19	373.15	10.16	32.4385	0.00
P-58	J-27	J-24	43.67	10.16	32.4385	0.00
P-6	J-71	J-72	388.95	6.08	32.4385	0.40
P-60	J-25	J-27	300.24	10.16	32.4385	0.17
P-61	J-28	J-25	187.57	10.16	32.4385	0.00
P-63	J-29	J-20	1346.63	8.18	50.0471	1.14
P-67	J-30	J-69	223.04	8.18	50.0471	0.57
P-69	J-31	J-32	521.13	12.14	34.9545	0.00
P-7	J-72	J-22	509.45	6.08	32.4385	0.87
P-71	J-33	J-32	543.94	12.14	34.9545	0.00
P-8	J-73	J-74	479.27	8.18	50.0471	0.40
P-81	J-29	J-28	196.49	10.16	32.4385	0.17
P-82	J-30	J-29	151.25	10.16	32.4385	0.00
P-83	J-36	J-30	129.33	10.16	32.4385	0.00
P-84	J-32	J-28	1184.63	6.08	32.4385	1.14
P-87	J-5	J-37	2251.87	6.08	32.4385	2.51
P-9	J-74	J-8	1448.13	8.18	50.0471	2.94
P-92	J-38	J-39	1173.25	10.16	32.4385	0.87
P-97	J-40	J-41	2063.01	6.08	32.4385	2.34

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		5.26	646.90	
J-10		6.49	665.57	
J-11		0.53	666.78	
J-12		1.05	666.41	
J-13		8.60	650.77	
J-14		16.67	663.73	
J-15		10.00	660.87	
J-16		11.41	659.23	
J-17		7.90	663.22	
J-18		10.00	662.56	
J-19		5.97	668.34	
J-2		1.25	648.06	
J-20		5.62	657.89	
J-21		4.04	657.51	
J-22		5.97	658.30	
J-23		5.79	662.32	
J-24		2.11	664.89	
J-25		1.58	665.93	
J-26		5.79	666.12	
J-27		4.91	665.03	
J-28		4.04	665.85	
J-29		2.98	664.95	
J-3		0.00	648.42	
J-30		0.88	665.84	
J-31		0.70	642.05	
J-32		3.51	651.80	
J-33		4.39	649.84	
J-34		0.00	645.38	
J-35		1.10	640.76	
J-36		5.48	665.80	

J-37		12.85	650.49	
J-38		10.39	648.18	
J-39		0.00	655.00	
J-4		0.00	646.84	
J-40		14.57	641.08	
J-41		14.78	650.63	
J-42		0.53	642.94	
J-43		14.43	648.38	
J-44		11.76	640.70	
J-45		0.18	655.58	
J-46	EC-SOCWA	5.97	658.00	
J-47	EC-Ferndale	0.00	641.36	
J-48		0.00	642.16	
J-49		11.23	643.24	
J-5		11.93	642.66	
J-50	1F	2.63	661.00	
J-51		8.07	648.00	
J-52		9.13	654.88	
J-53		0.00	655.33	
J-54		0.00	653.00	
J-55		0.00	650.63	
J-56		11.55	646.80	
J-59		0.99	649.53	
J-6		0.00	643.53	
J-60		0.00	648.00	
J-61		9.09	649.02	
J-62	EC-Ferndale	0.35	643.00	
J-63	EC-Ferndale	0.00	648.19	
J-64		13.07	647.71	
J-65		12.01	642.19	
J-66		0.00	646.83	
J-68		0.00	648.00	
J-69	1R	2.81	663.00	
J-7		4.21	658.64	
J-70		0.00	648.00	
J-71	2F	2.46	665.00	
J-72	2R	3.16	662.00	
J-73	3F	4.04	657.00	
J-74	3R	11.58	654.00	
J-75	4F	3.33	663.00	
J-76	4R	3.16	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	4.21	641.00	
J-8		9.30	654.08	
J-80	6F	11.06	648.00	
J-81	7R	4.74	641.00	
J-82	7F	12.81	640.00	
J-83	8F	6.14	642.00	
J-84	8R	15.27	644.00	
J-9		1.40	659.92	
PR-1	PR-1	----	648.00	802.77
PR-2	PR-2	----	658.00	802.72

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 100
NUMBER OF END NODES .....(J) = 81
NUMBER OF PRIMARY LOOPS .....(L) = 18
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 10 TRIALS: ACCURACY = 0.39071E-03

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

Revised Interim Improvements System with Second
SOCWA Supply; Future 2035 Maximum Day Demand

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	1.25	0.00	0.00	0.00	0.00	0.00
P-10	J-75	J-24	-6.94	0.05	0.00	0.08	0.09	0.09
P-103	J-38	J-82	10.30	0.26	0.00	0.11	0.19	0.19
P-107	J-43	J-44	8.55	0.28	0.00	0.09	0.13	0.13
P-11	J-76	J-75	-3.60	0.01	0.00	0.04	0.03	0.03
P-12	J-77	J-38	20.70	0.00	0.00	0.08	0.06	0.06
P-120	J-31	J-36	-74.53	0.05	0.00	0.20	0.05	0.05
P-125	J-8	J-21	-45.11	0.01	0.00	0.12	0.02	0.02
P-126	J-45	J-8	-0.18	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	-14.43	0.13	0.00	0.16	0.35	0.35
P-130	J-36	J-46	-130.88	0.17	0.00	0.35	0.14	0.14
P-14	J-78	J-61	-64.66	0.12	0.00	0.26	0.47	0.47
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	23.09	0.13	0.00	0.14	0.09	0.09
P-15	J-79	J-80	-4.56	0.03	0.00	0.05	0.04	0.04
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	-12.79	0.10	0.00	0.14	0.28	0.28
P-155	J-40	J-5	-13.47	0.13	0.00	0.15	0.31	0.31
P-156	J-6	J-34	-24.03	0.25	0.00	0.27	0.91	0.91
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-61	-15.62	0.52	0.00	0.17	0.41	0.41
P-17	J-81	J-42	-7.25	0.01	0.00	0.08	0.10	0.10
P-170	J-33	J-55	98.57	0.08	0.00	0.27	0.38	0.37
P-171	J-41	J-55	-98.57	0.05	0.00	0.27	0.37	0.37
P-172	J-37	J-41	-69.89	0.07	0.00	0.19	0.20	0.20
P-174	J-52	J-84	11.81	0.34	0.00	0.13	0.24	0.24
P-175	J-37	J-52	46.07	0.03	0.00	0.13	0.09	0.09

P-178	J-44	J-42	-5.02	0.02	0.00	0.06	0.05	0.05
P-179	J-56	J-49	9.42	0.35	0.00	0.10	0.16	0.16
P-18	J-82	J-81	-2.51	0.01	0.00	0.03	0.01	0.01
P-188	J-26	J-1	-30.43	0.26	0.00	0.19	0.15	0.15
P-189	J-43	J-77	20.70	0.01	0.00	0.08	0.06	0.06
P-19	J-83	J-6	-9.60	0.01	0.00	0.11	0.17	0.17
P-191	J-14	J-51	-37.58	0.31	0.00	0.15	0.17	0.17
P-192	J-59	J-60	-121.77	0.26	0.00	0.48	1.51	1.51
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-64.66	0.02	0.00	0.26	0.48	0.47
P-197	J-56	J-43	43.68	0.07	0.00	0.17	0.23	0.23
P-2	J-70	J-60	121.77	0.03	0.00	0.48	1.51	1.51
P-20	J-7	J-73	-20.01	0.01	0.00	0.12	0.07	0.07
P-201	J-62	J-79	-0.35	0.00	0.00	0.00	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	-3.46	0.02	0.00	0.04	0.03	0.03
P-210	J-59	J-13	6.34	0.00	0.00	0.03	0.01	0.01
P-217	J-64	J-59	-114.45	0.32	0.00	0.45	1.35	1.35
P-219	J-64	J-65	12.01	0.44	0.00	0.13	0.25	0.25
P-22-CV	PR-2	J-46	214.85	0.12	0.01	0.58	0.37	0.34
P-221	J-61	J-64	-89.37	0.25	0.00	0.35	0.85	0.85
P-239	J-12	J-14	-18.65	0.01	0.00	0.07	0.05	0.05
P-24	J-9	J-7	-1.40	0.00	0.00	0.01	0.00	0.00
P-243	J-16	J-18	1.27	0.00	0.00	0.01	0.00	0.00
P-25	J-10	J-11	0.53	0.00	0.00	0.01	0.00	0.00
P-255	J-51	J-70	158.72	0.04	0.00	0.63	2.47	2.47
P-264	J-34	J-35	1.10	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	1.81	0.00	0.00	0.02	0.01	0.01
P-266	J-26	J-19	19.03	0.00	0.00	0.08	0.05	0.05
P-268-CV	PR-1	J-3	204.38	0.00	0.00	0.55	0.23	0.23
P-269	J-51	J-3	-204.38	0.12	0.07	0.81	6.33	3.94
P-27	J-12	J-10	9.97	0.01	0.00	0.11	0.18	0.18
P-271	J-52	J-53	25.13	0.00	0.00	0.07	0.03	0.03
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-36.95	0.00	0.00	0.10	0.06	0.06
P-285	J-53	J-34	25.13	0.06	0.00	0.07	0.03	0.03
P-286	J-46	J-21	78.00	0.01	0.00	0.21	0.06	0.05
P-29	J-13	J-14	-2.26	0.02	0.00	0.03	0.01	0.01
P-3	J-4	J-70	-36.95	0.03	0.00	0.10	0.06	0.06
P-31	J-15	J-10	-2.95	0.03	0.00	0.03	0.02	0.02
P-32	J-15	J-7	-14.39	0.02	0.00	0.09	0.04	0.04
P-34	J-16	J-15	-7.34	0.04	0.00	0.08	0.10	0.10
P-35	J-16	J-17	-5.33	0.08	0.00	0.06	0.06	0.06
P-38	J-18	J-19	-5.26	0.07	0.00	0.06	0.05	0.05
P-4	J-50	J-31	4.53	0.00	0.00	0.03	0.00	0.00
P-41	J-20	J-21	-28.86	0.22	0.00	0.32	1.28	1.28
P-44	J-22	J-20	-14.59	0.14	0.00	0.16	0.36	0.36
P-46	J-23	J-22	-8.82	0.06	0.00	0.10	0.14	0.14
P-48	J-18	J-23	-3.47	0.01	0.00	0.04	0.03	0.03
P-49	J-23	J-76	-0.44	0.00	0.00	0.00	0.00	0.00
P-5	J-69	J-50	7.16	0.00	0.00	0.04	0.01	0.01
P-51	J-25	J-71	5.81	0.03	0.00	0.06	0.07	0.07
P-55	J-17	J-12	-7.63	0.00	0.00	0.03	0.01	0.01
P-56	J-26	J-17	5.60	0.00	0.00	0.02	0.01	0.01
P-57	J-24	J-19	-7.80	0.00	0.00	0.03	0.01	0.01
P-58	J-27	J-24	1.24	0.00	0.00	0.00	0.00	0.00
P-6	J-71	J-72	3.36	0.01	0.00	0.04	0.02	0.02

P-60	J-25	J-27	29.24	0.03	0.00	0.12	0.11	0.11
P-61	J-28	J-25	36.64	0.03	0.00	0.14	0.16	0.16
P-63	J-29	J-20	-8.65	0.02	0.00	0.05	0.01	0.01
P-67	J-30	J-69	9.97	0.00	0.00	0.06	0.02	0.02
P-69	J-31	J-32	78.35	0.13	0.00	0.22	0.24	0.24
P-7	J-72	J-22	0.20	0.00	0.00	0.00	0.00	0.00
P-71	J-33	J-32	-79.86	0.14	0.00	0.22	0.25	0.25
P-8	J-73	J-74	-24.05	0.05	0.00	0.15	0.10	0.10
P-81	J-29	J-28	45.70	0.05	0.00	0.18	0.25	0.25
P-82	J-30	J-29	40.03	0.03	0.00	0.16	0.19	0.19
P-83	J-36	J-30	50.87	0.04	0.00	0.20	0.30	0.30
P-84	J-32	J-28	-5.02	0.06	0.00	0.06	0.05	0.05
P-87	J-5	J-37	-10.97	0.48	0.00	0.12	0.21	0.21
P-9	J-74	J-8	-35.63	0.29	0.00	0.22	0.20	0.20
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-41	-13.89	0.68	0.00	0.15	0.33	0.33

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		5.26	802.51	646.90	155.60	67.43
J-10		6.49	802.24	665.57	136.66	59.22
J-11		0.53	802.24	666.78	135.46	58.70
J-12		1.05	802.25	666.41	135.84	58.86
J-13		8.60	802.24	650.77	151.47	65.64
J-14		16.67	802.26	663.73	138.53	60.03
J-15		10.00	802.21	660.87	141.35	61.25
J-16		11.41	802.17	659.23	142.94	61.94
J-17		7.90	802.25	663.22	139.03	60.25
J-18		10.00	802.17	662.56	139.61	60.50
J-19		5.97	802.24	668.34	133.90	58.03
J-2		1.25	802.51	648.06	154.45	66.93
J-20		5.62	802.37	657.89	144.48	62.61
J-21		4.04	802.59	657.51	145.08	62.87
J-22		5.97	802.23	658.30	143.94	62.37
J-23		5.79	802.18	662.32	139.85	60.60
J-24		2.11	802.24	664.89	137.35	59.52
J-25		1.58	802.27	665.93	136.34	59.08
J-26		5.79	802.25	666.12	136.13	58.99
J-27		4.91	802.24	665.03	137.21	59.46
J-28		4.04	802.30	665.85	136.45	59.13
J-29		2.98	802.35	664.95	137.40	59.54
J-3		0.00	802.77	648.42	154.34	66.88
J-30		0.88	802.38	665.84	136.54	59.17
J-31		0.70	802.37	642.05	160.32	69.47
J-32		3.51	802.24	651.80	150.44	65.19
J-33		4.39	802.11	649.84	152.27	65.98
J-34		0.00	801.81	645.38	156.43	67.79
J-35		1.10	801.81	640.76	161.04	69.79
J-36		5.48	802.42	665.80	136.62	59.20
J-37		12.85	801.91	650.49	151.41	65.61
J-38		10.39	801.44	648.18	153.26	66.41
J-39		0.00	801.44	655.00	146.44	63.46
J-4		0.00	802.51	646.84	155.66	67.45

J-40		14.57	801.30	641.08	160.22	69.43
J-41		14.78	801.98	650.63	151.35	65.59
J-42		0.53	801.19	642.94	158.26	68.58
J-43		14.43	801.45	648.38	153.08	66.33
J-44		11.76	801.18	640.70	160.48	69.54
J-45		0.18	802.58	655.58	147.00	63.70
J-46	EC-SOCWA	5.97	802.59	658.00	144.59	62.66
J-47	EC-Ferndale	0.00	801.81	641.36	160.44	69.53
J-48		0.00	801.81	642.16	159.65	69.18
J-49		11.23	801.17	643.24	157.93	68.44
J-5		11.93	801.43	642.66	158.76	68.80
J-50	1F	2.63	802.37	661.00	141.37	61.26
J-51		8.07	802.58	648.00	154.58	66.98
J-52		9.13	801.87	654.88	146.99	63.70
J-53		0.00	801.87	655.33	146.54	63.50
J-54		0.00	801.87	653.00	148.87	64.51
J-55		0.00	802.03	650.63	151.40	65.61
J-56		11.55	801.52	646.80	154.73	67.05
J-59		0.99	802.24	649.53	152.71	66.17
J-6		0.00	801.56	643.53	158.03	68.48
J-60		0.00	802.50	648.00	154.50	66.95
J-61		9.09	801.67	649.02	152.65	66.15
J-62	EC-Ferndale	0.35	801.12	643.00	158.12	68.52
J-63	EC-Ferndale	0.00	802.24	648.19	154.05	66.76
J-64		13.07	801.92	647.71	154.21	66.82
J-65		12.01	801.48	642.19	159.29	69.02
J-66		0.00	802.51	646.83	155.68	67.46
J-68		0.00	802.50	648.00	154.50	66.95
J-69	1R	2.81	802.38	663.00	139.38	60.40
J-7		4.21	802.23	658.64	143.59	62.22
J-70		0.00	802.53	648.00	154.53	66.97
J-71	2F	2.46	802.24	665.00	137.24	59.47
J-72	2R	3.16	802.23	662.00	140.23	60.77
J-73	3F	4.04	802.24	657.00	145.24	62.94
J-74	3R	11.58	802.29	654.00	148.29	64.26
J-75	4F	3.33	802.19	663.00	139.19	60.32
J-76	4R	3.16	802.18	661.00	141.18	61.18
J-77	5F	0.00	801.44	648.00	153.44	66.49
J-78	5R	0.00	801.55	647.00	154.55	66.97
J-79	6R	4.21	801.12	641.00	160.12	69.39
J-8		9.30	802.58	654.08	148.50	64.35
J-80	6F	11.06	801.15	648.00	153.15	66.36
J-81	7R	4.74	801.18	641.00	160.18	69.41
J-82	7F	12.81	801.18	640.00	161.18	69.84
J-83	8F	6.14	801.55	642.00	159.55	69.14
J-84	8R	15.27	801.53	644.00	157.53	68.26
J-9		1.40	802.23	659.92	142.31	61.67
PR-1	PR-1	----	802.77	648.00	154.77	67.07
PR-2	PR-2	----	802.72	658.00	144.72	62.71

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi

J-82	69.84	J-19	58.03
J-35	69.79	J-11	58.70
J-44	69.54	J-12	58.86
J-47	69.53	J-26	58.99
J-31	69.47	J-25	59.08

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	0.81	P-126	0.00
P-255	0.63	P-7	0.00
P-22	0.58	P-264	0.00
P-268	0.55	P-1	0.00
P-192	0.48	P-201	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	6.33	P-126	0.00
P-255	2.47	P-264	0.00
P-192	1.51	P-1	0.00
P-2	1.51	P-7	0.00
P-217	1.35	P-58	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	3.94	P-126	0.00
P-255	2.47	P-264	0.00
P-2	1.51	P-1	0.00
P-192	1.51	P-7	0.00
P-217	1.35	P-58	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
PR-1	204.38	PR-1
PR-2	214.85	PR-2

NET SYSTEM INFLOW = 419.23
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 419.23

==========

FireFlow/Hydrant Report
Fireflow/Hydrant Report:

Specified Minimum Pressure(psi or kPa): 20.0
Minimum Static Pressure(psi or kPa) : 20.0
Sp.Min Pres@FirePump Suctn(psi or kPa): 0.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2
Flow-3: Flowrate to maintain the specified pressure at Fire Pump Suction
(Flow-3 is based on combined value of hydrant and hose constants)

Hose Constant = 0.00

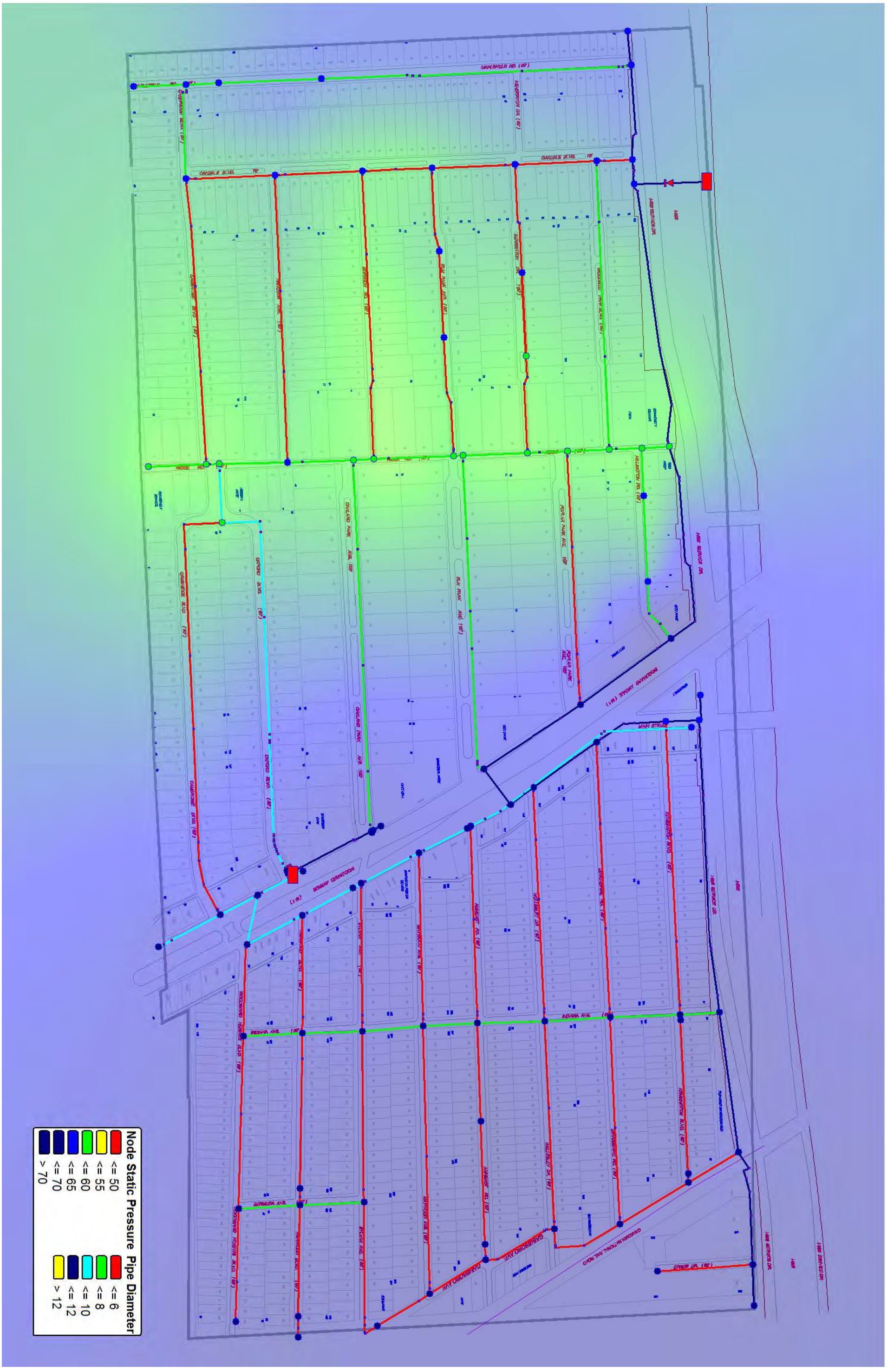
Hydrant Node	Hydrant Constant	Elevation	Demand gpm	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2
J-1	0.0	646.9	5.3	67.4	3345.3	3325.9	J-2
J-10	0.0	665.6	6.5	59.2	1262.2	1253.0	J-11
J-11	0.0	666.8	0.5	58.7	512.0		
J-12	0.0	666.4	1.1	58.9	2162.0		
J-13	0.0	650.8	8.6	65.6	2081.0		
J-14	0.0	663.7	16.7	60.0	2080.2		
J-15	0.0	660.9	10.0	61.3	1158.4		
J-16	0.0	659.2	11.4	61.9	999.4		
J-17	0.0	663.2	7.9	60.2	2397.1		
J-18	0.0	662.6	10.0	60.5	976.1		
J-19	0.0	668.3	6.0	58.0	2654.8		
J-2	0.0	648.1	1.2	66.9	3166.0		
J-20	0.0	657.9	5.6	62.6	1887.6		
J-21	0.0	657.5	4.0	62.9	7334.3		
J-22	0.0	658.3	6.0	62.4	1072.2		
J-23	0.0	662.3	5.8	60.6	988.2		
J-24	0.0	664.9	2.1	59.5	2843.2		
J-25	0.0	665.9	1.6	59.1	2762.0		
J-26	0.0	666.1	5.8	59.0	2724.7		
J-27	0.0	665.0	4.9	59.5	2893.2		
J-28	0.0	665.9	4.0	59.1	2901.9		
J-29	0.0	664.9	3.0	59.5	3309.4		
J-3	0.0	648.4	0.0	66.9	52606.1		
J-30	0.0	665.8	0.9	59.2	3705.8		
J-31	0.0	642.1	0.7	69.5	4223.3	4085.3	J-50
J-32	0.0	651.8	3.5	65.2	3011.7		
J-33	0.0	649.8	4.4	66.0	2585.4	2518.1	J-53
J-34	0.0	645.4	0.0	67.8	1221.2		
J-35	0.0	640.8	1.1	69.8	1127.7	1120.0	J-48
J-36	0.0	665.8	5.5	59.2	4548.1		
J-37	0.0	650.5	12.9	65.6	1852.8	1805.9	J-53
J-38	0.0	648.2	10.4	66.4	1099.4	1058.8	J-39
J-39	0.0	655.0	0.0	63.5	719.2		
J-4	0.0	646.8	0.0	67.5	3362.6	3344.3	J-2
J-40	0.0	641.1	14.6	69.4	901.8		
J-41	0.0	650.6	14.8	65.6	2152.2	2100.4	J-53

J-42	0.0	642.9	0.5	68.6	820.9		
J-43	0.0	648.4	14.4	66.3	1220.5	1178.5	J-39
J-44	0.0	640.7	11.8	69.5	739.8		
J-45	0.0	655.6	0.2	63.7	4658.9		
J-46	0.0	658.0	6.0	62.7	8720.5	8523.4	J-36
J-47	0.0	641.4	0.0	69.5	1089.2		
J-48	0.0	642.2	0.0	69.2	445.4		
J-49	0.0	643.2	11.2	68.4	587.4		
J-5	0.0	642.7	11.9	68.8	911.4		
J-50	0.0	661.0	2.6	61.3	2473.7		
J-51	0.0	648.0	8.1	67.0	6740.5	6651.1	J-39
J-52	0.0	654.9	9.1	63.7	1611.7	1608.4	J-53
J-53	0.0	655.3	0.0	63.5	1531.8		
J-54	0.0	653.0	0.0	64.5	1488.0		
J-55	0.0	650.6	0.0	65.6	2277.4	2224.1	J-53
J-56	0.0	646.8	11.6	67.0	1387.7	1333.5	J-39
J-59	0.0	649.5	1.0	66.2	2868.0	2838.9	J-39
J-6	0.0	643.5	0.0	68.5	968.6		
J-60	0.0	648.0	0.0	67.0	5028.7	4959.0	J-39
J-61	0.0	649.0	9.1	66.1	1594.7	1562.4	J-39
J-62	0.0	643.0	0.4	68.5	208.3		
J-63	0.0	648.2	0.0	66.8	1478.3		
J-64	0.0	647.7	13.1	66.8	2029.5	1985.1	J-39
J-65	0.0	642.2	12.0	69.0	235.4		
J-66	0.0	646.8	0.0	67.5	2495.5		
J-68	0.0	648.0	0.0	67.0	3509.8		
J-69	0.0	663.0	2.8	60.4	2557.3		
J-7	0.0	658.6	4.2	62.2	1181.1	1172.4	J-9
J-70	0.0	648.0	0.0	67.0	5944.2	5853.1	J-39
J-71	0.0	665.0	2.5	59.5	698.1		
J-72	0.0	662.0	3.2	60.8	672.3		
J-73	0.0	657.0	4.0	62.9	1204.5		
J-74	0.0	654.0	11.6	64.3	1304.1		
J-75	0.0	663.0	3.3	60.3	674.8		
J-76	0.0	661.0	3.2	61.2	684.9		
J-77	0.0	648.0	0.0	66.5	1097.3	1055.5	J-39
J-78	0.0	647.0	0.0	67.0	1401.9	1349.8	J-39
J-79	0.0	641.0	4.2	69.4	219.6	217.5	J-62
J-8	0.0	654.1	9.3	64.4	5189.5	5147.7	J-45
J-80	0.0	648.0	11.1	66.4	264.1		
J-81	0.0	641.0	4.7	69.4	755.4		
J-82	0.0	640.0	12.8	69.8	571.9		
J-83	0.0	642.0	6.1	69.1	893.2		
J-84	0.0	644.0	15.3	68.3	567.4		
J-9	0.0	659.9	1.4	61.7	999.7		

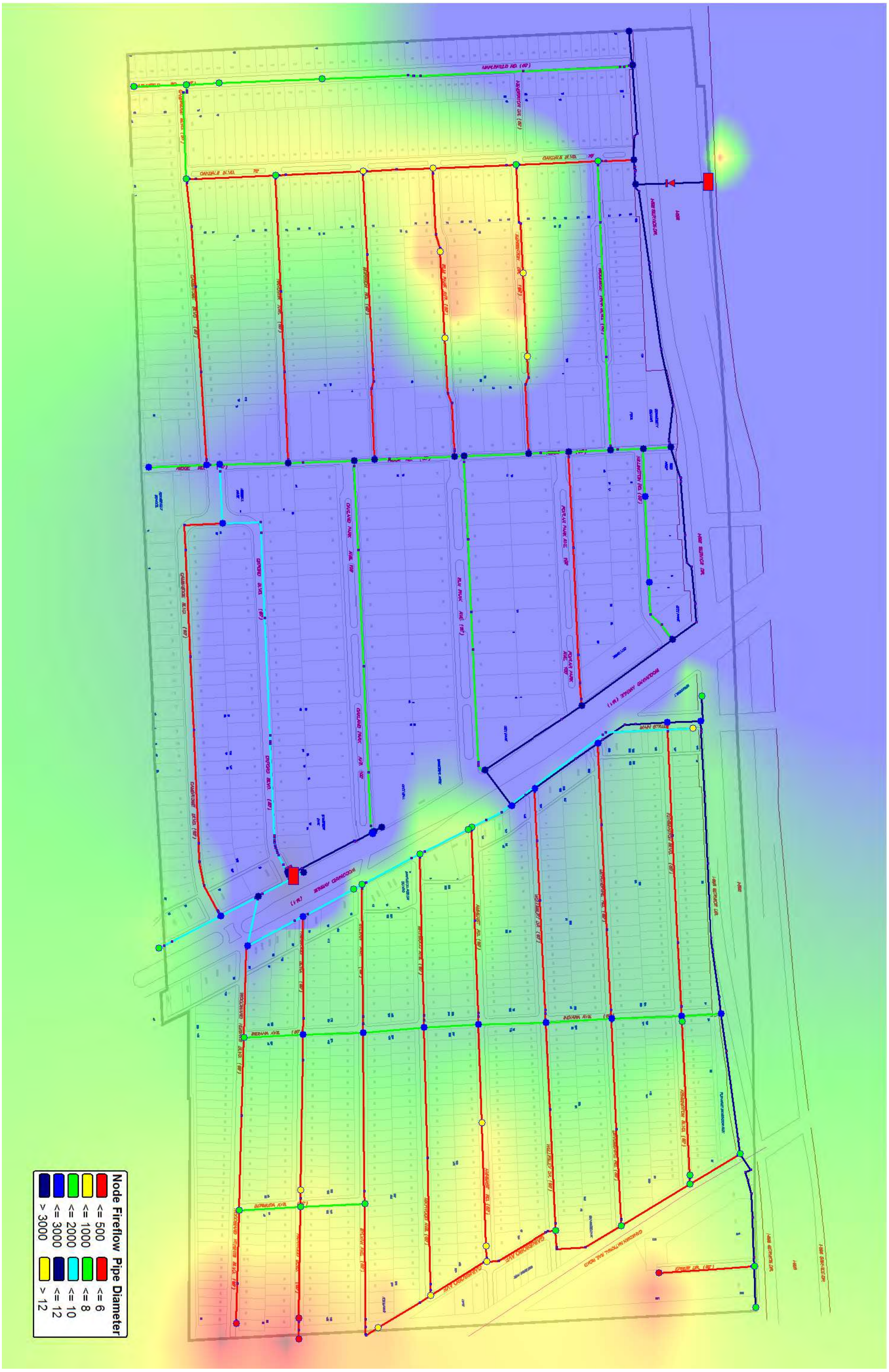
APPENDIX H

Master Plan Improvements Water Distribution System; 2035 Maximum Day Demand Results

Includes:
Static Pressure Gradient Map; Master Plan Improvements, 2035 Maximum Day Demand
Available Fire Flow Gradient Map; Master Plan Improvements, 2035 Max. Day Demand
Computer Model Simulation; Master Plan Improvements, 2035 Maximum Day Demand



Static Pressure; Master Plan Improvements; 2035 Maximum Day Demand



Available Fire Flow; Master Plan Improvements; 2035 Maximum Day Demand

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 7.022a  07/08/2015                              *
*  Serial #:  6-5116761                                     *
*  Interface:  Classic                                      *
*  Licensed for Pipe2014                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 Date & Time:  Wed Jan 13 14:28:28 2016

 Master File : m:\0175\0175-0095\gen\reports\kypipe\import\socwa
revision\watermodelfuture2035.KYP\watermodelfuture2035.P2K
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SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.14	34.9545	0.00
P-10	J-75	J-24	557.86	6.08	32.4385	1.27
P-103	J-38	J-86	918.61	6.08	32.4385	1.14
P-107	J-43	J-87	810.14	6.08	32.4385	0.57
P-11	J-76	J-75	402.54	6.08	32.4385	0.40
P-12	J-77	J-38	19.18	10.16	32.4385	0.17
P-120	J-31	J-36	972.64	12.34	76.3750	2.37
P-125	J-8	J-21	445.59	12.34	76.3750	0.70
P-126	J-45	J-8	160.81	12.34	76.3750	0.00
P-13	J-5	J-6	373.36	6.08	32.4385	0.00
P-130	J-36	J-46	1250.08	12.34	76.3750	1.79
P-14	J-78	J-61	266.57	10.16	32.4385	0.17
P-148	J-47	J-35	190.47	12.14	34.9545	0.17
P-149	J-27	J-33	1489.24	8.18	50.0471	2.98
P-15	J-79	J-90	519.77	6.08	32.4385	0.57
P-152	J-48	J-35	445.75	6.08	32.4385	0.57
P-154	J-42	J-40	362.71	6.08	32.4385	0.70
P-155	J-40	J-5	415.41	6.08	32.4385	1.27
P-156	J-6	J-34	275.42	6.08	32.4385	0.17
P-157	J-53	J-54	124.93	12.14	34.9545	0.75
P-16	J-80	J-92	723.98	6.08	32.4385	0.00
P-17	J-81	J-42	72.50	6.08	32.4385	0.17
P-170	J-33	J-55	209.02	12.14	34.9545	0.34

P-171	J-41	J-55	134.03	12.14	34.9545	0.00
P-172	J-37	J-41	362.21	12.14	34.9545	0.00
P-174	J-52	J-58	1368.63	6.08	32.4385	1.54
P-175	J-37	J-52	349.33	12.14	34.9545	0.69
P-178	J-44	J-42	304.86	6.08	32.4385	0.35
P-179	J-56	J-88	688.85	6.08	32.4385	0.57
P-18	J-82	J-81	575.79	6.08	32.4385	0.57
P-188	J-26	J-1	1732.31	8.18	50.0471	1.89
P-189	J-43	J-77	250.49	10.16	32.4385	0.57
P-19	J-83	J-6	42.96	6.08	32.4385	0.17
P-191	J-14	J-51	1820.36	10.16	32.4385	2.81
P-192	J-59	J-60	171.60	10.16	32.4385	0.17
P-192a	J-60	J-68	67.12	10.16	32.4385	0.17
P-195	J-56	J-78	45.89	10.16	32.4385	0.40
P-197	J-56	J-43	304.88	10.16	32.4385	0.57
P-2	J-70	J-60	22.81	10.16	32.4385	0.00
P-20	J-7	J-73	152.54	8.18	50.0471	0.57
P-201	J-62	J-79	95.36	6.08	32.4385	0.57
P-209	J-13	J-63	324.39	10.16	32.4385	0.34
P-21	J-84	J-83	716.44	6.08	32.4385	0.40
P-210	J-59	J-13	198.02	10.16	32.4385	0.17
P-217	J-64	J-59	236.90	10.16	32.4385	0.17
P-219	J-64	J-93	428.51	6.08	32.4385	0.52
P-22	J-57	J-34	658.95	12.14	34.9545	0.00
P-221	J-61	J-64	294.29	10.16	32.4385	0.17
P-23	J-58	J-84	25.75	6.08	32.4385	0.00
P-239	J-12	J-14	275.83	10.16	32.4385	0.17
P-24	J-9	J-7	245.04	8.18	50.0471	0.17
P-243	J-16	J-18	408.03	6.08	32.4385	0.17
P-25	J-10	J-11	270.51	8.27	114.0000	0.00
P-255	J-51	J-70	16.36	10.16	32.4385	0.00
P-26	J-67	J-37	1285.05	6.08	32.4385	1.14
P-264	J-34	J-35	559.29	12.14	34.9545	1.62
P-265	J-44	J-49	287.63	6.08	32.4385	0.17
P-266	J-26	J-19	95.17	8.27	114.0000	0.00
P-268-CV	PR-1	J-3	17.14	12.34	91.1586	0.00
P-269	J-51	J-3	30.19	10.16	32.4385	7.09
P-27	J-12	J-10	61.27	8.27	114.0000	0.17
P-271	J-52	J-53	156.58	12.14	34.9545	0.00
P-272	J-66	J-4	8.87	6.08	32.4385	0.17
P-275	J-1	J-4	9.76	12.14	34.9545	0.00
P-28	J-85	J-41	1092.79	6.08	32.4385	1.54
P-285	J-53	J-57	1367.61	12.14	34.9545	0.34
P-286	J-46	J-21	116.24	12.34	76.3750	0.87
P-29	J-13	J-14	2021.68	6.08	32.4385	2.52
P-3	J-4	J-70	436.95	12.14	34.9545	0.70
P-30	J-86	J-82	457.17	6.08	32.4385	0.40
P-31	J-15	J-10	1335.13	6.08	32.4385	1.14
P-32	J-15	J-7	455.35	8.18	50.0471	1.84
P-33	J-87	J-44	1248.22	6.08	32.4385	0.80
P-34	J-16	J-15	416.64	6.08	32.4385	0.17
P-35	J-16	J-17	1343.13	6.08	32.4385	1.14
P-36	J-88	J-89	798.25	6.08	32.4385	0.57
P-37	J-57	J-58	184.20	8.27	114.0000	0.34
P-38	J-18	J-19	1348.06	6.08	32.4385	1.84
P-39	J-58	J-67	327.35	8.27	114.0000	0.34
P-4	J-50	J-31	303.86	8.18	50.0471	0.52

P-40	J-67	J-85	305.77	8.27	114.0000	0.34
P-41	J-20	J-21	168.80	6.08	32.4385	0.34
P-42	J-85	J-86	315.17	8.27	114.0000	0.34
P-43	J-86	J-87	252.23	8.27	114.0000	0.34
P-44	J-22	J-20	381.01	6.08	32.4385	0.17
P-45	J-87	J-88	284.30	8.27	114.0000	0.34
P-46	J-23	J-22	387.52	6.08	32.4385	0.00
P-47	J-89	J-49	677.75	6.08	32.4385	1.32
P-48	J-18	J-23	325.49	6.08	32.4385	0.57
P-49	J-23	J-76	391.70	6.08	32.4385	1.27
P-5	J-69	J-50	401.89	8.18	50.0471	0.40
P-50	J-90	J-80	77.45	6.08	32.4385	0.57
P-51	J-25	J-71	454.23	6.08	32.4385	1.27
P-52	J-91	J-65	527.19	6.08	32.4385	0.57
P-53	J-89	J-90	299.25	8.27	114.0000	0.34
P-54	J-90	J-91	286.19	8.27	114.0000	0.34
P-55	J-17	J-12	318.63	8.27	114.0000	0.00
P-56	J-26	J-17	306.82	8.27	114.0000	0.00
P-57	J-24	J-19	373.15	8.27	114.0000	0.00
P-58	J-27	J-24	43.67	8.27	114.0000	0.00
P-59	J-92	J-61	551.44	6.08	32.4385	0.57
P-6	J-71	J-72	388.95	6.08	32.4385	0.40
P-60	J-25	J-27	300.24	8.27	114.0000	0.17
P-61	J-28	J-25	187.57	8.27	114.0000	0.00
P-62	J-93	J-91	806.42	6.08	32.4385	0.40
P-63	J-29	J-20	1346.63	8.18	50.0471	1.14
P-64	J-88	J-92	280.77	8.27	114.0000	0.34
P-65	J-92	J-93	276.28	8.27	114.0000	0.34
P-66-CV	PR-2	J-46	339.34	12.34	76.3750	1.74
P-67	J-30	J-69	223.04	8.18	50.0471	0.57
P-69	J-31	J-32	521.13	12.14	34.9545	0.00
P-7	J-72	J-22	509.45	6.08	32.4385	0.87
P-71	J-33	J-32	543.94	12.14	34.9545	0.00
P-8	J-73	J-74	479.27	8.18	50.0471	0.40
P-81	J-29	J-28	196.49	8.27	114.0000	0.17
P-82	J-30	J-29	151.25	8.27	114.0000	0.00
P-83	J-36	J-30	129.33	8.27	114.0000	0.00
P-84	J-32	J-28	1184.63	6.08	32.4385	1.14
P-87	J-5	J-67	966.84	6.08	32.4385	1.37
P-9	J-74	J-8	1448.13	8.18	50.0471	2.94
P-92	J-38	J-39	1173.25	10.16	32.4385	0.87
P-97	J-40	J-85	970.22	6.08	32.4385	0.97

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		5.26	646.90	
J-10		6.49	665.57	
J-11		0.53	666.78	
J-12		1.05	666.41	
J-13		8.60	650.77	
J-14		16.67	663.73	
J-15		10.00	660.87	
J-16		11.41	659.23	

J-17		7.90	663.22
J-18		10.00	662.56
J-19		5.97	668.34
J-2		1.25	648.06
J-20		5.62	657.89
J-21		4.04	657.51
J-22		5.97	658.30
J-23		5.79	662.32
J-24		2.11	664.89
J-25		1.58	665.93
J-26		5.79	666.12
J-27		4.91	665.03
J-28		4.04	665.85
J-29		2.98	664.95
J-3		0.00	648.42
J-30		0.88	665.84
J-31		0.70	642.05
J-32		3.51	651.80
J-33		4.39	649.84
J-34		0.00	645.38
J-35		1.10	640.76
J-36		5.48	665.80
J-37		7.06	650.49
J-38		6.88	648.18
J-39		0.00	655.00
J-4		0.00	646.84
J-40		7.72	641.08
J-41		7.06	650.63
J-42		0.53	642.94
J-43		6.18	648.38
J-44		8.25	640.70
J-45		0.18	655.58
J-46	EC-SOCWA	5.97	658.00
J-47	EC-Ferndale	0.00	641.36
J-48		0.00	642.16
J-49		2.81	643.24
J-5		5.79	642.66
J-50	1F	2.63	661.00
J-51		8.07	648.00
J-52		9.13	654.88
J-53		0.00	655.33
J-54		0.00	653.00
J-55		0.00	650.63
J-56		3.31	646.80
J-57		0.00	641.00
J-58		9.13	644.00
J-59		0.99	649.53
J-6		0.00	643.53
J-60		0.00	648.00
J-61		4.18	649.02
J-62	EC-Ferndale	0.35	643.00
J-63	EC-Ferndale	0.00	648.19
J-64		3.07	647.71
J-65		4.46	642.19
J-66		0.00	646.83
J-67		11.93	645.00
J-68		0.00	648.00

J-69	1R	2.81	663.00	
J-7		4.21	658.64	
J-70		0.00	648.00	
J-71	2F	2.46	665.00	
J-72	2R	3.16	662.00	
J-73	3F	4.04	657.00	
J-74	3R	11.58	654.00	
J-75	4F	3.33	663.00	
J-76	4R	3.16	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	3.86	641.00	
J-8		9.30	654.08	
J-80	6F	5.26	645.00	
J-81	7R	4.74	641.00	
J-82	7F	7.72	640.00	
J-83	8F	6.14	642.00	
J-84	8R	6.14	644.00	
J-85		14.57	645.00	
J-86		8.60	644.00	
J-87		11.76	644.00	
J-88		8.42	645.00	
J-89		8.25	642.00	
J-9		1.40	659.92	
J-90		3.86	643.00	
J-91		10.00	643.00	
J-92		7.20	644.00	
J-93		7.55	644.00	
PR-1	PR-1	----	648.00	802.77
PR-2		----	658.00	802.72

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 122
NUMBER OF END NODES .....(J) = 93
NUMBER OF PRIMARY LOOPS .....(L) = 28
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 10 TRIALS: ACCURACY = 0.28043E-03

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

Revised Master Plan Improvements with Second
SOCWA Supply; Future 2035 Maximum Day Demand

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	1.25	0.00	0.00	0.00	0.00	0.00
P-10	J-75	J-24	-7.68	0.06	0.00	0.08	0.11	0.11
P-103	J-38	J-86	10.11	0.17	0.00	0.11	0.18	0.18
P-107	J-43	J-87	11.19	0.18	0.00	0.12	0.22	0.22
P-11	J-76	J-75	-4.34	0.02	0.00	0.05	0.04	0.04
P-12	J-77	J-38	16.99	0.00	0.00	0.07	0.04	0.04
P-120	J-31	J-36	-69.49	0.04	0.00	0.19	0.04	0.04
P-125	J-8	J-21	-43.27	0.01	0.00	0.12	0.02	0.02
P-126	J-45	J-8	-0.18	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	-7.37	0.04	0.00	0.08	0.10	0.10
P-130	J-36	J-46	-144.11	0.20	0.00	0.39	0.17	0.16
P-14	J-78	J-61	-51.43	0.08	0.00	0.20	0.31	0.31
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	30.84	0.23	0.00	0.19	0.15	0.15
P-15	J-79	J-90	-4.21	0.02	0.00	0.05	0.04	0.04
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	-6.91	0.03	0.00	0.08	0.09	0.09
P-155	J-40	J-5	-7.31	0.04	0.00	0.08	0.10	0.10
P-156	J-6	J-34	-9.02	0.04	0.00	0.10	0.15	0.15
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-92	-11.47	0.17	0.00	0.13	0.23	0.23
P-17	J-81	J-42	-0.78	0.00	0.00	0.01	0.00	0.00
P-170	J-33	J-55	108.21	0.09	0.00	0.30	0.45	0.44
P-171	J-41	J-55	-108.21	0.06	0.00	0.30	0.44	0.44
P-172	J-37	J-41	-87.00	0.11	0.00	0.24	0.30	0.30
P-174	J-52	J-58	8.50	0.18	0.00	0.09	0.13	0.13
P-175	J-37	J-52	69.26	0.07	0.00	0.19	0.20	0.19
P-178	J-44	J-42	-5.61	0.02	0.00	0.06	0.06	0.06
P-179	J-56	J-88	13.76	0.22	0.00	0.15	0.32	0.32
P-18	J-82	J-81	3.96	0.02	0.00	0.04	0.03	0.03
P-188	J-26	J-1	-29.31	0.24	0.00	0.18	0.14	0.14
P-189	J-43	J-77	16.99	0.01	0.00	0.07	0.04	0.04
P-19	J-83	J-6	-1.65	0.00	0.00	0.02	0.01	0.01
P-191	J-14	J-51	-36.16	0.29	0.00	0.14	0.16	0.16
P-192	J-59	J-60	-113.43	0.23	0.00	0.45	1.33	1.32
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-51.43	0.01	0.00	0.20	0.31	0.31
P-197	J-56	J-43	34.37	0.04	0.00	0.14	0.15	0.15
P-2	J-70	J-60	113.43	0.03	0.00	0.45	1.32	1.32
P-20	J-7	J-73	-18.17	0.01	0.00	0.11	0.06	0.06
P-201	J-62	J-79	-0.35	0.00	0.00	0.00	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	4.49	0.03	0.00	0.05	0.04	0.04
P-210	J-59	J-13	7.64	0.00	0.00	0.03	0.01	0.01
P-217	J-64	J-59	-104.80	0.27	0.00	0.41	1.15	1.14
P-219	J-64	J-93	27.34	0.50	0.00	0.30	1.16	1.16
P-22	J-57	J-34	10.12	0.00	0.00	0.03	0.01	0.01
P-221	J-61	J-64	-74.40	0.18	0.00	0.29	0.61	0.61
P-23	J-58	J-84	10.63	0.01	0.00	0.12	0.20	0.20
P-239	J-12	J-14	-18.52	0.01	0.00	0.07	0.05	0.05
P-24	J-9	J-7	-1.40	0.00	0.00	0.01	0.00	0.00

P-243	J-16	J-18	1.06	0.00	0.00	0.01	0.00	0.00
P-25	J-10	J-11	0.53	0.00	0.00	0.00	0.00	0.00
P-255	J-51	J-70	149.25	0.04	0.00	0.59	2.20	2.20
P-26	J-67	J-37	-10.67	0.26	0.00	0.12	0.20	0.20
P-264	J-34	J-35	1.10	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	5.31	0.02	0.00	0.06	0.06	0.06
P-266	J-26	J-19	16.15	0.00	0.00	0.10	0.01	0.01
P-268-CV	PR-1	J-3	193.48	0.00	0.00	0.52	0.20	0.20
P-269	J-51	J-3	-193.48	0.11	0.06	0.77	5.70	3.56
P-27	J-12	J-10	11.25	0.00	0.00	0.07	0.01	0.00
P-271	J-52	J-53	51.63	0.02	0.00	0.14	0.11	0.11
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-35.83	0.00	0.00	0.10	0.06	0.06
P-28	J-85	J-41	-14.15	0.37	0.00	0.16	0.34	0.34
P-285	J-53	J-57	51.63	0.15	0.00	0.14	0.11	0.11
P-286	J-46	J-21	75.66	0.01	0.00	0.20	0.05	0.05
P-29	J-13	J-14	-0.96	0.00	0.00	0.01	0.00	0.00
P-3	J-4	J-70	-35.83	0.03	0.00	0.10	0.06	0.06
P-30	J-86	J-82	11.68	0.11	0.00	0.13	0.24	0.24
P-31	J-15	J-10	-4.23	0.05	0.00	0.05	0.04	0.04
P-32	J-15	J-7	-12.56	0.01	0.00	0.08	0.03	0.03
P-33	J-87	J-44	7.95	0.15	0.00	0.09	0.12	0.12
P-34	J-16	J-15	-6.78	0.04	0.00	0.07	0.09	0.09
P-35	J-16	J-17	-5.69	0.08	0.00	0.06	0.06	0.06
P-36	J-88	J-89	11.03	0.17	0.00	0.12	0.22	0.22
P-37	J-57	J-58	41.51	0.01	0.00	0.25	0.06	0.05
P-38	J-18	J-19	-5.71	0.09	0.00	0.06	0.06	0.06
P-39	J-58	J-67	30.26	0.01	0.00	0.18	0.03	0.03
P-4	J-50	J-31	9.29	0.01	0.00	0.06	0.02	0.02
P-40	J-67	J-85	23.27	0.01	0.00	0.14	0.02	0.02
P-41	J-20	J-21	-28.36	0.21	0.00	0.31	1.24	1.24
P-42	J-85	J-86	15.53	0.00	0.00	0.09	0.01	0.01
P-43	J-86	J-87	5.35	0.00	0.00	0.03	0.00	0.00
P-44	J-22	J-20	-12.96	0.11	0.00	0.14	0.29	0.29
P-45	J-87	J-88	-3.17	0.00	0.00	0.02	0.00	0.00
P-46	J-23	J-22	-7.84	0.04	0.00	0.09	0.11	0.11
P-47	J-89	J-49	-2.50	0.01	0.00	0.03	0.01	0.01
P-48	J-18	J-23	-3.23	0.01	0.00	0.04	0.02	0.02
P-49	J-23	J-76	-1.18	0.00	0.00	0.01	0.00	0.00
P-5	J-69	J-50	11.92	0.01	0.00	0.07	0.03	0.03
P-50	J-90	J-80	-6.20	0.01	0.00	0.07	0.07	0.07
P-51	J-25	J-71	6.46	0.04	0.00	0.07	0.08	0.08
P-52	J-91	J-65	4.46	0.02	0.00	0.05	0.04	0.04
P-53	J-89	J-90	5.28	0.00	0.00	0.03	0.00	0.00
P-54	J-90	J-91	3.41	0.00	0.00	0.02	0.00	0.00
P-55	J-17	J-12	-6.22	0.00	0.00	0.04	0.00	0.00
P-56	J-26	J-17	7.37	0.00	0.00	0.04	0.00	0.00
P-57	J-24	J-19	-4.48	0.00	0.00	0.03	0.00	0.00
P-58	J-27	J-24	5.31	0.00	0.00	0.03	0.00	0.00
P-59	J-92	J-61	-18.78	0.32	0.00	0.21	0.58	0.58
P-6	J-71	J-72	4.01	0.01	0.00	0.04	0.03	0.03
P-60	J-25	J-27	41.06	0.02	0.00	0.25	0.05	0.05
P-61	J-28	J-25	49.10	0.01	0.00	0.29	0.07	0.07
P-62	J-93	J-91	11.05	0.17	0.00	0.12	0.22	0.22
P-63	J-29	J-20	-9.78	0.02	0.00	0.06	0.02	0.02
P-64	J-88	J-92	-8.86	0.00	0.00	0.05	0.00	0.00
P-65	J-92	J-93	-8.74	0.00	0.00	0.05	0.00	0.00

P-66-CV	PR-2	J-46	225.74	0.13	0.01	0.61	0.41	0.38
P-67	J-30	J-69	14.73	0.01	0.00	0.09	0.04	0.04
P-69	J-31	J-32	78.08	0.13	0.00	0.22	0.24	0.24
P-7	J-72	J-22	0.85	0.00	0.00	0.01	0.00	0.00
P-71	J-33	J-32	-81.76	0.14	0.00	0.23	0.26	0.26
P-8	J-73	J-74	-22.21	0.04	0.00	0.14	0.08	0.08
P-81	J-29	J-28	60.33	0.02	0.00	0.36	0.11	0.11
P-82	J-30	J-29	53.53	0.01	0.00	0.32	0.09	0.09
P-83	J-36	J-30	69.14	0.02	0.00	0.41	0.14	0.14
P-84	J-32	J-28	-7.19	0.12	0.00	0.08	0.10	0.10
P-87	J-5	J-67	-5.73	0.06	0.00	0.06	0.06	0.06
P-9	J-74	J-8	-33.79	0.26	0.00	0.21	0.18	0.18
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-85	-7.33	0.10	0.00	0.08	0.10	0.10

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		5.26	802.53	646.90	155.63	67.44
J-10		6.49	802.29	665.57	136.72	59.24
J-11		0.53	802.29	666.78	135.51	58.72
J-12		1.05	802.29	666.41	135.88	58.88
J-13		8.60	802.30	650.77	151.53	65.66
J-14		16.67	802.30	663.73	138.57	60.05
J-15		10.00	802.24	660.87	141.38	61.26
J-16		11.41	802.21	659.23	142.98	61.96
J-17		7.90	802.29	663.22	139.07	60.27
J-18		10.00	802.20	662.56	139.64	60.51
J-19		5.97	802.29	668.34	133.95	58.05
J-2		1.25	802.53	648.06	154.48	66.94
J-20		5.62	802.37	657.89	144.47	62.60
J-21		4.04	802.58	657.51	145.07	62.86
J-22		5.97	802.26	658.30	143.96	62.38
J-23		5.79	802.21	662.32	139.89	60.62
J-24		2.11	802.29	664.89	137.40	59.54
J-25		1.58	802.31	665.93	136.37	59.09
J-26		5.79	802.29	666.12	136.17	59.01
J-27		4.91	802.29	665.03	137.26	59.48
J-28		4.04	802.32	665.85	136.47	59.14
J-29		2.98	802.34	664.95	137.39	59.54
J-3		0.00	802.77	648.42	154.34	66.88
J-30		0.88	802.36	665.84	136.51	59.15
J-31		0.70	802.33	642.05	160.28	69.45
J-32		3.51	802.20	651.80	150.40	65.17
J-33		4.39	802.06	649.84	152.22	65.96
J-34		0.00	801.56	645.38	156.18	67.68
J-35		1.10	801.56	640.76	160.79	69.68
J-36		5.48	802.37	665.80	136.58	59.18
J-37		7.06	801.80	650.49	151.31	65.57
J-38		6.88	801.70	648.18	153.52	66.53
J-39		0.00	801.70	655.00	146.70	63.57
J-4		0.00	802.53	646.84	155.69	67.46
J-40		7.72	801.44	641.08	160.36	69.49
J-41		7.06	801.91	650.63	151.28	65.56

J-42		0.53	801.40	642.94	158.47	68.67
J-43		6.18	801.71	648.38	153.33	66.44
J-44		8.25	801.38	640.70	160.69	69.63
J-45		0.18	802.57	655.58	146.99	63.70
J-46	EC-SOCWA	5.97	802.58	658.00	144.58	62.65
J-47	EC-Ferndale	0.00	801.56	641.36	160.19	69.42
J-48		0.00	801.56	642.16	159.40	69.07
J-49		2.81	801.37	643.24	158.12	68.52
J-5		5.79	801.48	642.66	158.81	68.82
J-50	1F	2.63	802.34	661.00	141.34	61.25
J-51		8.07	802.59	648.00	154.59	66.99
J-52		9.13	801.73	654.88	146.85	63.63
J-53		0.00	801.71	655.33	146.39	63.43
J-54		0.00	801.71	653.00	148.71	64.44
J-55		0.00	801.97	650.63	151.34	65.58
J-56		3.31	801.75	646.80	154.96	67.15
J-57		0.00	801.56	641.00	160.56	69.58
J-58		9.13	801.55	644.00	157.55	68.27
J-59		0.99	802.30	649.53	152.77	66.20
J-6		0.00	801.52	643.53	157.99	68.46
J-60		0.00	802.53	648.00	154.53	66.96
J-61		4.18	801.85	649.02	152.83	66.23
J-62	EC-Ferndale	0.35	801.34	643.00	158.34	68.61
J-63	EC-Ferndale	0.00	802.30	648.19	154.11	66.78
J-64		3.07	802.03	647.71	154.32	66.87
J-65		4.46	801.34	642.19	159.15	68.96
J-66		0.00	802.53	646.83	155.70	67.47
J-67		11.93	801.54	645.00	156.54	67.83
J-68		0.00	802.53	648.00	154.53	66.96
J-69	1R	2.81	802.35	663.00	139.35	60.38
J-7		4.21	802.26	658.64	143.61	62.23
J-70		0.00	802.56	648.00	154.56	66.98
J-71	2F	2.46	802.27	665.00	137.27	59.48
J-72	2R	3.16	802.26	662.00	140.26	60.78
J-73	3F	4.04	802.26	657.00	145.26	62.95
J-74	3R	11.58	802.30	654.00	148.30	64.27
J-75	4F	3.33	802.23	663.00	139.23	60.33
J-76	4R	3.16	802.21	661.00	141.21	61.19
J-77	5F	0.00	801.70	648.00	153.70	66.60
J-78	5R	0.00	801.77	647.00	154.77	67.07
J-79	6R	3.86	801.34	641.00	160.34	69.48
J-8		9.30	802.57	654.08	148.49	64.35
J-80	6F	5.26	801.36	645.00	156.36	67.76
J-81	7R	4.74	801.40	641.00	160.40	69.51
J-82	7F	7.72	801.42	640.00	161.42	69.95
J-83	8F	6.14	801.51	642.00	159.51	69.12
J-84	8R	6.14	801.54	644.00	157.54	68.27
J-85		14.57	801.53	645.00	156.53	67.83
J-86		8.60	801.53	644.00	157.53	68.26
J-87		11.76	801.53	644.00	157.53	68.26
J-88		8.42	801.53	645.00	156.53	67.83
J-89		8.25	801.36	642.00	159.36	69.06
J-9		1.40	802.25	659.92	142.33	61.68
J-90		3.86	801.36	643.00	158.36	68.62
J-91		10.00	801.36	643.00	158.36	68.62
J-92		7.20	801.53	644.00	157.53	68.26
J-93		7.55	801.53	644.00	157.53	68.26

PR-1	PR-1	----	802.77	648.00	154.77	67.07
PR-2		----	802.72	658.00	144.72	62.71

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-82	69.95	J-19	58.05
J-35	69.68	J-11	58.72
J-44	69.63	J-12	58.88
J-57	69.58	J-26	59.01
J-81	69.51	J-25	59.09

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	0.77	P-126	0.00
P-66	0.61	P-264	0.00
P-255	0.59	P-25	0.00
P-268	0.52	P-1	0.00
P-192	0.45	P-201	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	5.70	P-126	0.00
P-255	2.20	P-25	0.00
P-192	1.33	P-264	0.00
P-2	1.32	P-1	0.00
P-41	1.24	P-201	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	3.56	P-126	0.00
P-255	2.20	P-25	0.00
P-192	1.32	P-264	0.00
P-2	1.32	P-1	0.00
P-41	1.24	P-201	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE

PR-1	193.48	PR-1
PR-2	225.74	

NET SYSTEM INFLOW = 419.23
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 419.23

==========

FireFlow/Hydrant Report

Fireflow/Hydrant Report:

Specified Minimum Pressure(psi or kPa): 20.0
Minimum Static Pressure(psi or kPa) : 20.0
Sp.Min Pres@FirePump Suctn(psi or kPa): 0.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2
Flow-3: Flowrate to maintain the specified pressure at Fire Pump Suction
(Flow-3 is based on combined value of hydrant and hose constants)

Hose Constant = 0.00

Hydrant Node	Hydrant Constant	Elevation	Demand gpm	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2
J-1	0.0	646.9	5.3	67.4	3439.8	3419.9	J-2
J-10	0.0	665.6	6.5	59.2	2804.9	2784.1	J-11
J-11	0.0	666.8	0.5	58.7	2308.7		
J-12	0.0	666.4	1.1	58.9	2919.4	2913.6	J-11
J-13	0.0	650.8	8.6	65.7	2261.1		
J-14	0.0	663.7	16.7	60.0	2438.1		
J-15	0.0	660.9	10.0	61.3	1169.0		
J-16	0.0	659.2	11.4	62.0	1006.7		
J-17	0.0	663.2	7.9	60.3	3270.9		
J-18	0.0	662.6	10.0	60.5	983.5		
J-19	0.0	668.3	6.0	58.0	3586.1		
J-2	0.0	648.1	1.2	66.9	3247.6		
J-20	0.0	657.9	5.6	62.6	1921.4		
J-21	0.0	657.5	4.0	62.9	7595.7		
J-22	0.0	658.3	6.0	62.4	1080.3		
J-23	0.0	662.3	5.8	60.6	995.8		
J-24	0.0	664.9	2.1	59.5	3928.8		
J-25	0.0	665.9	1.6	59.1	4030.0		
J-26	0.0	666.1	5.8	59.0	3592.7		
J-27	0.0	665.0	4.9	59.5	3974.5		
J-28	0.0	665.9	4.0	59.1	4198.7		
J-29	0.0	664.9	3.0	59.5	4543.9		
J-3	0.0	648.4	0.0	66.9	53081.9		
J-30	0.0	665.8	0.9	59.2	4793.8		
J-31	0.0	642.1	0.7	69.5	4702.2	4584.2	J-50
J-32	0.0	651.8	3.5	65.2	3439.8		

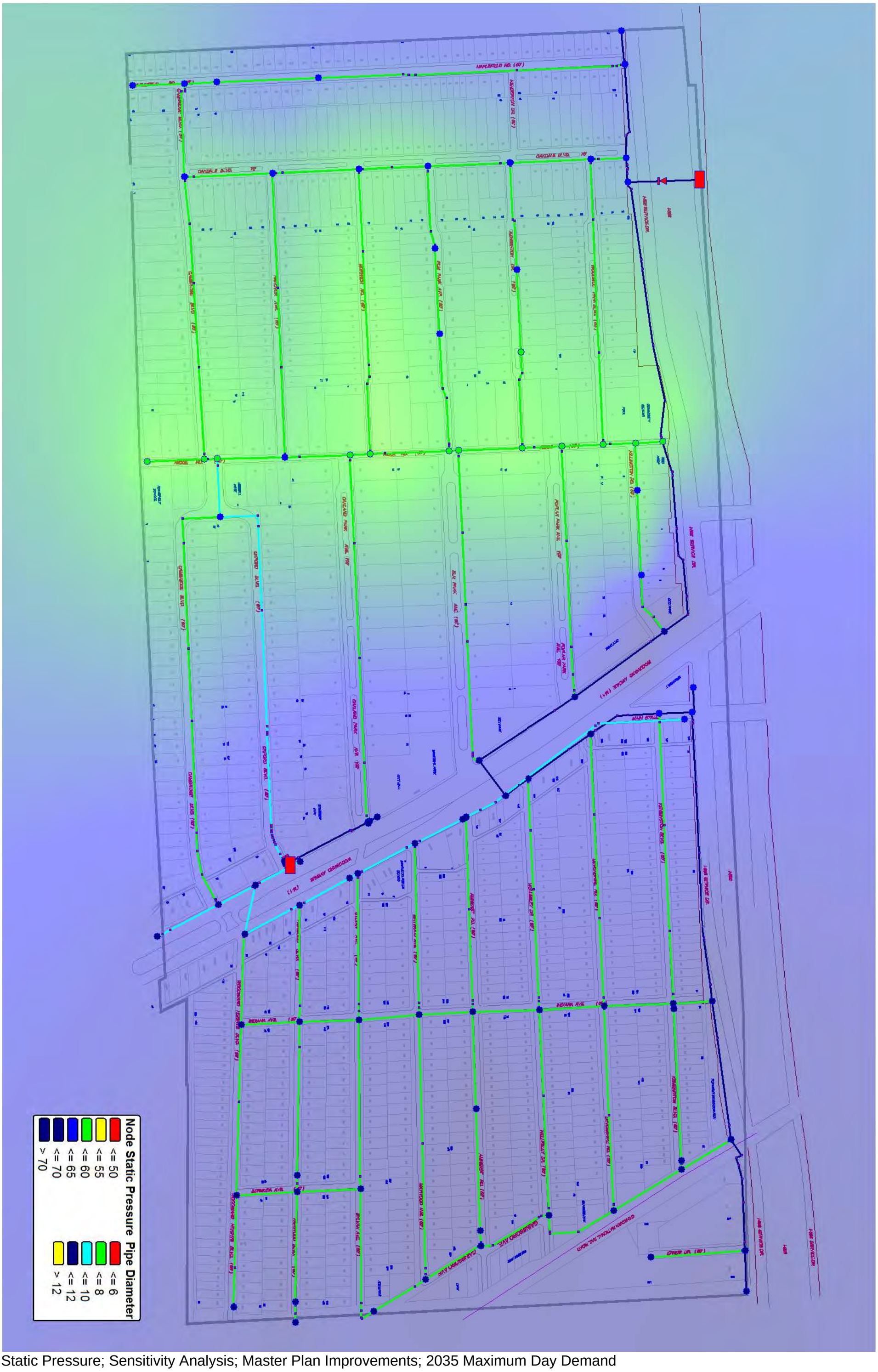
J-33	0.0	649.8	4.4	66.0	3126.1		
J-34	0.0	645.4	0.0	67.7	1736.1		
J-35	0.0	640.8	1.1	69.7	1476.3	1466.1	J-48
J-36	0.0	665.8	5.5	59.2	5176.8		
J-37	0.0	650.5	7.1	65.6	2415.8	2412.8	J-52
J-38	0.0	648.2	6.9	66.5	1425.9	1374.2	J-39
J-39	0.0	655.0	0.0	63.6	813.8		
J-4	0.0	646.8	0.0	67.5	3458.9	3440.2	J-2
J-40	0.0	641.1	7.7	69.5	1021.9		
J-41	0.0	650.6	7.1	65.6	2701.6		
J-42	0.0	642.9	0.5	68.7	985.9		
J-43	0.0	648.4	6.2	66.4	1635.4	1588.5	J-39
J-44	0.0	640.7	8.2	69.6	931.8		
J-45	0.0	655.6	0.2	63.7	4719.7		
J-46	0.0	658.0	6.0	62.7	9168.6		
J-47	0.0	641.4	0.0	69.4	1398.5		
J-48	0.0	642.2	0.0	69.1	462.7		
J-49	0.0	643.2	2.8	68.5	753.2		
J-5	0.0	642.7	5.8	68.8	1037.0		
J-50	0.0	661.0	2.6	61.2	2583.9		
J-51	0.0	648.0	8.1	67.0	7279.9		
J-52	0.0	654.9	9.1	63.6	2186.5		
J-53	0.0	655.3	0.0	63.4	2108.5		
J-54	0.0	653.0	0.0	64.4	1983.1		
J-55	0.0	650.6	0.0	65.6	2825.8		
J-56	0.0	646.8	3.3	67.1	1883.1	1855.1	J-39
J-57	0.0	641.0	0.0	69.6	2211.3	2165.9	J-34
J-58	0.0	644.0	9.1	68.3	2208.4		
J-59	0.0	649.5	1.0	66.2	3406.1	3395.3	J-13
J-6	0.0	643.5	0.0	68.5	1152.6		
J-60	0.0	648.0	0.0	67.0	5533.2		
J-61	0.0	649.0	4.2	66.2	2143.8		
J-62	0.0	643.0	0.4	68.6	376.8		
J-63	0.0	648.2	0.0	66.8	1544.0		
J-64	0.0	647.7	3.1	66.9	2625.7		
J-65	0.0	642.2	4.5	69.0	408.8		
J-66	0.0	646.8	0.0	67.5	2535.9		
J-67	0.0	645.0	11.9	67.8	2229.1		
J-68	0.0	648.0	0.0	67.0	3680.9		
J-69	0.0	663.0	2.8	60.4	2727.8		
J-7	0.0	658.6	4.2	62.2	1189.3	1180.7	J-9
J-70	0.0	648.0	0.0	67.0	6469.4		
J-71	0.0	665.0	2.5	59.5	704.9		
J-72	0.0	662.0	3.2	60.8	676.4		
J-73	0.0	657.0	4.0	62.9	1212.2		
J-74	0.0	654.0	11.6	64.3	1310.4		
J-75	0.0	663.0	3.3	60.3	680.1		
J-76	0.0	661.0	3.2	61.2	688.9		
J-77	0.0	648.0	0.0	66.6	1432.4	1379.7	J-39
J-78	0.0	647.0	0.0	67.1	1905.0	1892.6	J-39
J-79	0.0	641.0	3.9	69.5	414.3	410.3	J-62
J-8	0.0	654.1	9.3	64.3	5271.5	5228.9	J-45
J-80	0.0	645.0	5.3	67.8	962.2		
J-81	0.0	641.0	4.7	69.5	901.2		
J-82	0.0	640.0	7.7	69.9	784.5		
J-83	0.0	642.0	6.1	69.1	1069.6		
J-84	0.0	644.0	6.1	68.3	1641.0		

J-85	0.0	645.0	14.6	67.8	2245.2
J-86	0.0	644.0	8.6	68.3	2235.7
J-87	0.0	644.0	11.8	68.3	2210.0
J-88	0.0	645.0	8.4	67.8	2142.2
J-89	0.0	642.0	8.2	69.1	1108.9
J-9	0.0	659.9	1.4	61.7	1005.0
J-90	0.0	643.0	3.9	68.6	1099.9
J-91	0.0	643.0	10.0	68.6	1090.8
J-92	0.0	644.0	7.2	68.3	2083.3
J-93	0.0	644.0	7.5	68.3	1981.0

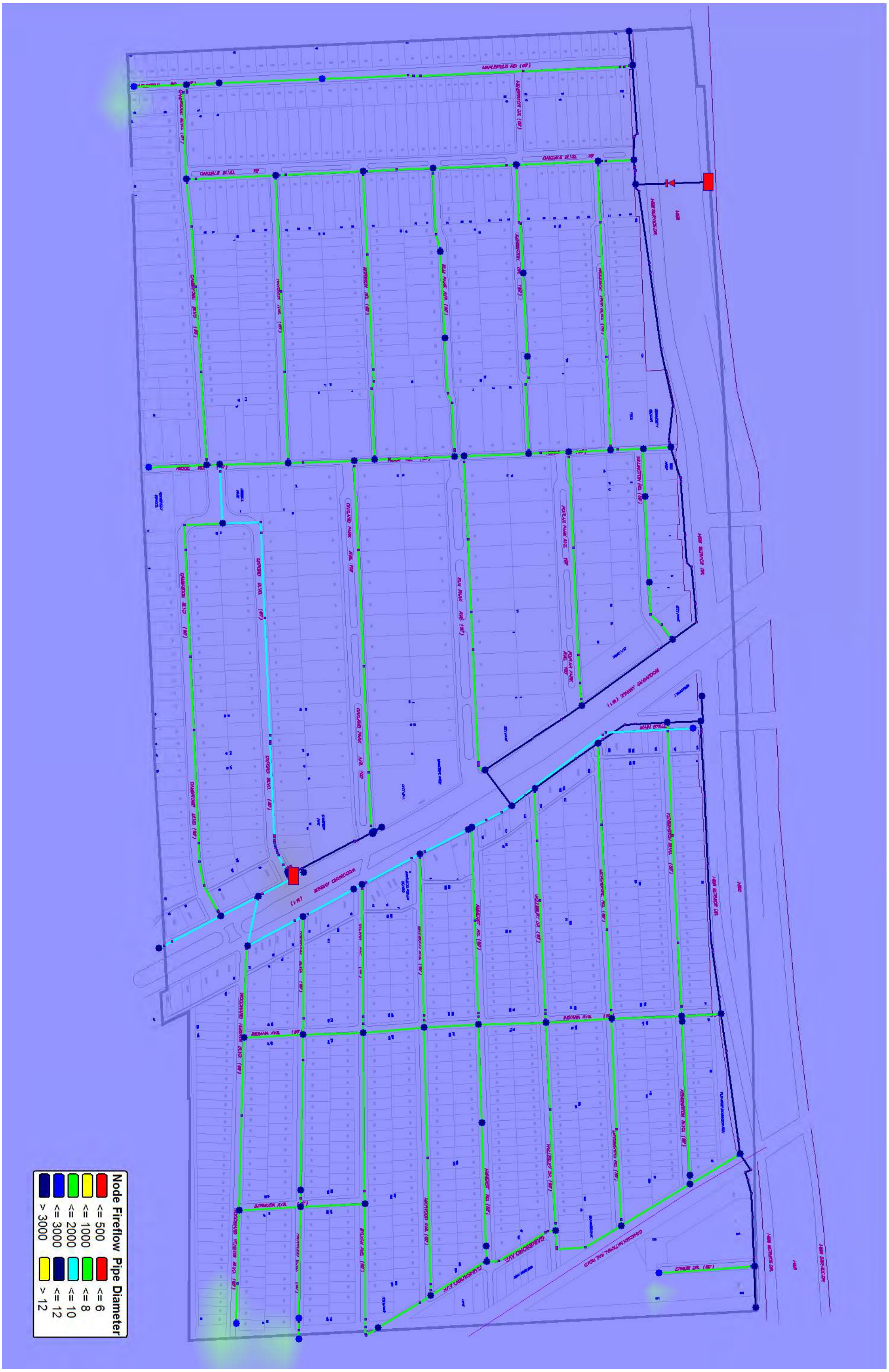
APPENDIX I

Master Plan Improvements Water Distribution System; 2035 Maximum Day Demand Sensitivity Analysis Results

Includes:
Static Pressures Gradient Map; Sensitivity Analysis
Available Fire Flow Gradient Map; Sensitivity Analysis
Computer Model Simulation; Sensitivity Analysis



Static Pressure; Sensitivity Analysis; Master Plan Improvements; 2035 Maximum Day Demand



Available Fire Flow; Sensitivity Analysis; Master Plan Improvements; 2035 Maximum Day Demand

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*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
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 Date & Time:  Wed Jan 13 15:11:12 2016

 Master File : m:\0175\0175-0095\gen\reports\kypipe\import\socwa
revision\watermodelsensitivity.KYP\watermodelsensitivity.P2K
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SUMMARY OF ORIGINAL DATA

UNITS SPECIFIED

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

PIPELINE DATA

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	39.45	12.34	90.0000	0.00
P-10	J-75	J-24	557.86	8.27	90.0000	1.27
P-103	J-38	J-86	918.61	8.27	90.0000	1.14
P-107	J-43	J-87	810.14	8.27	90.0000	0.57
P-11	J-76	J-75	402.54	8.27	90.0000	0.40
P-12	J-77	J-38	19.18	10.28	90.0000	0.17
P-120	J-31	J-36	972.64	12.34	90.0000	2.37
P-125	J-8	J-21	445.59	12.34	90.0000	0.70
P-126	J-45	J-8	160.81	12.34	90.0000	0.00
P-13	J-5	J-6	373.36	8.27	90.0000	0.00
P-130	J-36	J-46	1250.08	12.34	90.0000	1.79
P-14	J-78	J-61	266.57	10.28	90.0000	0.17
P-148	J-47	J-35	190.47	12.34	90.0000	0.17
P-149	J-27	J-33	1489.24	8.27	90.0000	2.98
P-15	J-79	J-90	519.77	8.27	90.0000	0.57
P-152	J-48	J-35	445.75	8.27	90.0000	0.57
P-154	J-42	J-40	362.71	8.27	90.0000	0.70
P-155	J-40	J-5	415.41	8.27	90.0000	1.27
P-156	J-6	J-34	275.42	8.27	90.0000	0.17
P-157	J-53	J-54	124.93	12.34	90.0000	0.75
P-16	J-80	J-92	723.98	8.27	90.0000	0.00
P-17	J-81	J-42	72.50	8.27	90.0000	0.17
P-170	J-33	J-55	209.02	12.34	90.0000	0.34

P-171	J-41	J-55	134.03	12.34	90.0000	0.00
P-172	J-37	J-41	362.21	12.34	90.0000	0.00
P-174	J-52	J-58	1368.63	8.27	90.0000	1.54
P-175	J-37	J-52	349.33	12.34	90.0000	0.69
P-178	J-44	J-42	304.86	8.27	90.0000	0.35
P-179	J-56	J-88	688.85	8.27	90.0000	0.57
P-18	J-82	J-81	575.79	8.27	90.0000	0.57
P-188	J-26	J-1	1732.31	8.27	90.0000	1.89
P-189	J-43	J-77	250.49	10.28	90.0000	0.57
P-19	J-83	J-6	42.96	8.27	90.0000	0.17
P-191	J-14	J-51	1820.36	10.28	90.0000	2.81
P-192	J-59	J-60	171.60	10.28	90.0000	0.17
P-192a	J-60	J-68	67.12	10.28	90.0000	0.17
P-195	J-56	J-78	45.89	10.28	90.0000	0.40
P-197	J-56	J-43	304.88	10.28	90.0000	0.57
P-2	J-70	J-60	22.81	10.28	90.0000	0.00
P-20	J-7	J-73	152.54	8.27	90.0000	0.57
P-201	J-62	J-79	95.36	8.27	90.0000	0.57
P-209	J-13	J-63	324.39	10.28	90.0000	0.34
P-21	J-84	J-83	716.44	8.27	90.0000	0.40
P-210	J-59	J-13	198.02	10.28	90.0000	0.17
P-217	J-64	J-59	236.90	10.28	90.0000	0.17
P-219	J-64	J-93	428.51	8.27	90.0000	0.52
P-22	J-57	J-34	658.95	12.34	90.0000	0.00
P-221	J-61	J-64	294.29	10.28	90.0000	0.17
P-23	J-58	J-84	25.75	8.27	90.0000	0.00
P-239	J-12	J-14	275.83	10.28	90.0000	0.17
P-24	J-9	J-7	245.04	8.27	90.0000	0.17
P-243	J-16	J-18	408.03	8.27	90.0000	0.17
P-25	J-10	J-11	270.51	8.27	90.0000	0.00
P-255	J-51	J-70	16.36	10.28	90.0000	0.00
P-26	J-67	J-37	1285.05	8.27	90.0000	1.14
P-264	J-34	J-35	559.29	12.34	90.0000	1.62
P-265	J-44	J-49	287.63	8.27	90.0000	0.17
P-266	J-26	J-19	95.17	8.27	90.0000	0.00
P-268-CV	PR-1	J-3	17.14	12.34	90.0000	0.00
P-269	J-51	J-3	30.19	10.28	90.0000	7.09
P-27	J-12	J-10	61.27	8.27	90.0000	0.17
P-271	J-52	J-53	156.58	12.34	90.0000	0.00
P-272	J-66	J-4	8.87	8.27	90.0000	0.17
P-275	J-1	J-4	9.76	12.34	90.0000	0.00
P-28	J-85	J-41	1092.79	8.27	90.0000	1.54
P-285	J-53	J-57	1367.61	12.34	90.0000	0.34
P-286	J-46	J-21	116.24	12.34	90.0000	0.87
P-29	J-13	J-14	2021.68	8.27	90.0000	2.52
P-3	J-4	J-70	436.95	12.34	90.0000	0.70
P-30	J-86	J-82	457.17	8.27	90.0000	0.40
P-31	J-15	J-10	1335.13	8.27	90.0000	1.14
P-32	J-15	J-7	455.35	8.27	90.0000	1.84
P-33	J-87	J-44	1248.22	8.27	90.0000	0.80
P-34	J-16	J-15	416.64	8.27	90.0000	0.17
P-35	J-16	J-17	1343.13	8.27	90.0000	1.14
P-36	J-88	J-89	798.25	8.27	90.0000	0.57
P-37	J-57	J-58	184.20	8.27	90.0000	0.34
P-38	J-18	J-19	1348.06	8.27	90.0000	1.84
P-39	J-58	J-67	327.35	8.27	90.0000	0.34
P-4	J-50	J-31	303.86	8.27	90.0000	0.52

P-40	J-67	J-85	305.77	8.27	90.0000	0.34
P-41	J-20	J-21	168.80	8.27	90.0000	0.34
P-42	J-85	J-86	315.17	8.27	90.0000	0.34
P-43	J-86	J-87	252.23	8.27	90.0000	0.34
P-44	J-22	J-20	381.01	8.27	90.0000	0.17
P-45	J-87	J-88	284.30	8.27	90.0000	0.34
P-46	J-23	J-22	387.52	8.27	90.0000	0.00
P-47	J-89	J-49	677.75	8.27	90.0000	1.32
P-48	J-18	J-23	325.49	8.27	90.0000	0.57
P-49	J-23	J-76	391.70	8.27	90.0000	1.27
P-5	J-69	J-50	401.89	8.27	90.0000	0.40
P-50	J-90	J-80	77.45	8.27	90.0000	0.57
P-51	J-25	J-71	454.23	8.27	90.0000	1.27
P-52	J-91	J-65	527.19	8.27	90.0000	0.57
P-53	J-89	J-90	299.25	8.27	90.0000	0.34
P-54	J-90	J-91	286.19	8.27	90.0000	0.34
P-55	J-17	J-12	318.63	8.27	90.0000	0.00
P-56	J-26	J-17	306.82	8.27	90.0000	0.00
P-57	J-24	J-19	373.15	8.27	90.0000	0.00
P-58	J-27	J-24	43.67	8.27	90.0000	0.00
P-59	J-92	J-61	551.44	8.27	90.0000	0.57
P-6	J-71	J-72	388.95	8.27	90.0000	0.40
P-60	J-25	J-27	300.24	8.27	90.0000	0.17
P-61	J-28	J-25	187.57	8.27	90.0000	0.00
P-62	J-93	J-91	806.42	8.27	90.0000	0.40
P-63	J-29	J-20	1346.63	8.27	90.0000	1.14
P-64	J-88	J-92	280.77	8.27	90.0000	0.34
P-65	J-92	J-93	276.28	8.27	90.0000	0.34
P-66-CV	PR-2	J-46	339.34	12.34	90.0000	1.74
P-67	J-30	J-69	223.04	8.27	90.0000	0.57
P-69	J-31	J-32	521.13	12.34	90.0000	0.00
P-7	J-72	J-22	509.45	8.27	90.0000	0.87
P-71	J-33	J-32	543.94	12.34	90.0000	0.00
P-8	J-73	J-74	479.27	8.27	90.0000	0.40
P-81	J-29	J-28	196.49	8.27	90.0000	0.17
P-82	J-30	J-29	151.25	8.27	90.0000	0.00
P-83	J-36	J-30	129.33	8.27	90.0000	0.00
P-84	J-32	J-28	1184.63	8.27	90.0000	1.14
P-87	J-5	J-67	966.84	8.27	90.0000	1.37
P-9	J-74	J-8	1448.13	8.27	90.0000	2.94
P-92	J-38	J-39	1173.25	10.28	90.0000	0.87
P-97	J-40	J-85	970.22	8.27	90.0000	0.97

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		5.26	646.90	
J-10		6.49	665.57	
J-11		0.53	666.78	
J-12		1.05	666.41	
J-13		8.60	650.77	
J-14		16.67	663.73	
J-15		10.00	660.87	
J-16		11.41	659.23	

J-17		7.90	663.22
J-18		10.00	662.56
J-19		5.97	668.34
J-2		1.25	648.06
J-20		5.62	657.89
J-21		4.04	657.51
J-22		5.97	658.30
J-23		5.79	662.32
J-24		2.11	664.89
J-25		1.58	665.93
J-26		5.79	666.12
J-27		4.91	665.03
J-28		4.04	665.85
J-29		2.98	664.95
J-3		0.00	648.42
J-30		0.88	665.84
J-31		0.70	642.05
J-32		3.51	651.80
J-33		4.39	649.84
J-34		0.00	645.38
J-35		1.10	640.76
J-36		5.48	665.80
J-37		7.06	650.49
J-38		6.88	648.18
J-39		0.00	655.00
J-4		0.00	646.84
J-40		7.72	641.08
J-41		7.06	650.63
J-42		0.53	642.94
J-43		6.18	648.38
J-44		8.25	640.70
J-45		0.18	655.58
J-46	EC-SOCWA	5.97	658.00
J-47	EC-Ferndale	0.00	641.36
J-48		0.00	642.16
J-49		2.81	643.24
J-5		5.79	642.66
J-50	1F	2.63	661.00
J-51		8.07	648.00
J-52		9.13	654.88
J-53		0.00	655.33
J-54		0.00	653.00
J-55		0.00	650.63
J-56		3.31	646.80
J-57		0.00	641.00
J-58		9.13	644.00
J-59		0.99	649.53
J-6		0.00	643.53
J-60		0.00	648.00
J-61		4.18	649.02
J-62	EC-Ferndale	0.35	643.00
J-63	EC-Ferndale	0.00	648.19
J-64		3.07	647.71
J-65		4.46	642.19
J-66		0.00	646.83
J-67		11.93	645.00
J-68		0.00	648.00

J-69	1R	2.81	663.00	
J-7		4.21	658.64	
J-70		0.00	648.00	
J-71	2F	2.46	665.00	
J-72	2R	3.16	662.00	
J-73	3F	4.04	657.00	
J-74	3R	11.58	654.00	
J-75	4F	3.33	663.00	
J-76	4R	3.16	661.00	
J-77	5F	0.00	648.00	
J-78	5R	0.00	647.00	
J-79	6R	3.86	641.00	
J-8		9.30	654.08	
J-80	6F	5.26	645.00	
J-81	7R	4.74	641.00	
J-82	7F	7.72	640.00	
J-83	8F	6.14	642.00	
J-84	8R	6.14	644.00	
J-85		14.57	645.00	
J-86		8.60	644.00	
J-87		11.76	644.00	
J-88		8.42	645.00	
J-89		8.25	642.00	
J-9		1.40	659.92	
J-90		3.86	643.00	
J-91		10.00	643.00	
J-92		7.20	644.00	
J-93		7.55	644.00	
PR-1	PR-1	----	648.00	802.77
PR-2		----	658.00	802.72

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 122
NUMBER OF END NODES .....(J) = 93
NUMBER OF PRIMARY LOOPS .....(L) = 28
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 10 TRIALS: ACCURACY = 0.12938E-03

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

Revised Master Plan Improvements with Second
SOCWA Supply; Future 2035 Maximum Day Demand;
Sensitivity Analysis (All DI Pipe, Minimum 8" Diameter,
All Roughness "C" Factors set to 90)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	1.25	0.00	0.00	0.00	0.00	0.00
P-10	J-75	J-24	2.02	0.00	0.00	0.01	0.00	0.00
P-103	J-38	J-86	9.04	0.00	0.00	0.05	0.01	0.01
P-107	J-43	J-87	10.38	0.01	0.00	0.06	0.01	0.01
P-11	J-76	J-75	5.36	0.00	0.00	0.03	0.00	0.00
P-12	J-77	J-38	15.92	0.00	0.00	0.06	0.01	0.00
P-120	J-31	J-36	-50.60	0.02	0.00	0.14	0.02	0.02
P-125	J-8	J-21	-35.10	0.00	0.00	0.09	0.01	0.01
P-126	J-45	J-8	-0.18	0.00	0.00	0.00	0.00	0.00
P-13	J-5	J-6	-6.99	0.00	0.00	0.04	0.00	0.00
P-130	J-36	J-46	-84.86	0.06	0.00	0.23	0.05	0.05
P-14	J-78	J-61	-49.74	0.01	0.00	0.19	0.04	0.04
P-148	J-47	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-149	J-27	J-33	20.34	0.03	0.00	0.12	0.02	0.02
P-15	J-79	J-90	-4.21	0.00	0.00	0.03	0.00	0.00
P-152	J-48	J-35	0.00	0.00	0.00	0.00	0.00	0.00
P-154	J-42	J-40	-3.34	0.00	0.00	0.02	0.00	0.00
P-155	J-40	J-5	-5.50	0.00	0.00	0.03	0.00	0.00
P-156	J-6	J-34	-10.10	0.00	0.00	0.06	0.01	0.01
P-157	J-53	J-54	0.00	0.00	0.00	0.00	0.00	0.00
P-16	J-80	J-92	-14.71	0.01	0.00	0.09	0.01	0.01
P-17	J-81	J-42	-3.60	0.00	0.00	0.02	0.00	0.00
P-170	J-33	J-55	90.76	0.01	0.00	0.24	0.05	0.05
P-171	J-41	J-55	-90.76	0.01	0.00	0.24	0.05	0.05
P-172	J-37	J-41	-63.98	0.01	0.00	0.17	0.03	0.03
P-174	J-52	J-58	10.12	0.01	0.00	0.06	0.01	0.01
P-175	J-37	J-52	43.37	0.00	0.00	0.12	0.01	0.01
P-178	J-44	J-42	0.79	0.00	0.00	0.00	0.00	0.00
P-179	J-56	J-88	13.95	0.01	0.00	0.08	0.01	0.01
P-18	J-82	J-81	1.14	0.00	0.00	0.01	0.00	0.00
P-188	J-26	J-1	-27.80	0.07	0.00	0.17	0.04	0.04
P-189	J-43	J-77	15.92	0.00	0.00	0.06	0.01	0.00
P-19	J-83	J-6	-3.11	0.00	0.00	0.02	0.00	0.00
P-191	J-14	J-51	-46.90	0.07	0.00	0.18	0.04	0.04
P-192	J-59	J-60	-138.90	0.05	0.00	0.54	0.28	0.28
P-192a	J-60	J-68	0.00	0.00	0.00	0.00	0.00	0.00
P-195	J-56	J-78	-49.74	0.00	0.00	0.19	0.05	0.04
P-197	J-56	J-43	32.49	0.01	0.00	0.13	0.02	0.02
P-2	J-70	J-60	138.90	0.01	0.00	0.54	0.28	0.28
P-20	J-7	J-73	-10.01	0.00	0.00	0.06	0.01	0.01
P-201	J-62	J-79	-0.35	0.00	0.00	0.00	0.00	0.00
P-209	J-13	J-63	0.00	0.00	0.00	0.00	0.00	0.00
P-21	J-84	J-83	3.04	0.00	0.00	0.02	0.00	0.00
P-210	J-59	J-13	15.65	0.00	0.00	0.06	0.00	0.00
P-217	J-64	J-59	-122.26	0.05	0.00	0.47	0.22	0.22
P-219	J-64	J-93	42.38	0.04	0.00	0.25	0.09	0.09
P-22	J-57	J-34	11.20	0.00	0.00	0.03	0.00	0.00
P-221	J-61	J-64	-76.81	0.03	0.00	0.30	0.09	0.09

P-23	J-58	J-84	9.18	0.00	0.00	0.05	0.01	0.01
P-239	J-12	J-14	-37.28	0.01	0.00	0.14	0.02	0.02
P-24	J-9	J-7	-1.40	0.00	0.00	0.01	0.00	0.00
P-243	J-16	J-18	1.50	0.00	0.00	0.01	0.00	0.00
P-25	J-10	J-11	0.53	0.00	0.00	0.00	0.00	0.00
P-255	J-51	J-70	173.22	0.01	0.00	0.67	0.41	0.41
P-26	J-67	J-37	-13.55	0.01	0.00	0.08	0.01	0.01
P-264	J-34	J-35	1.10	0.00	0.00	0.00	0.00	0.00
P-265	J-44	J-49	-3.03	0.00	0.00	0.02	0.00	0.00
P-266	J-26	J-19	24.80	0.00	0.00	0.15	0.03	0.03
P-268-CV	PR-1	J-3	228.19	0.00	0.00	0.61	0.28	0.28
P-269	J-51	J-3	-228.19	0.02	0.09	0.88	3.53	0.69
P-27	J-12	J-10	17.76	0.00	0.00	0.11	0.02	0.02
P-271	J-52	J-53	24.12	0.00	0.00	0.06	0.00	0.00
P-272	J-66	J-4	0.00	0.00	0.00	0.00	0.00	0.00
P-275	J-1	J-4	-34.32	0.00	0.00	0.09	0.01	0.01
P-28	J-85	J-41	-19.71	0.02	0.00	0.12	0.02	0.02
P-285	J-53	J-57	24.12	0.01	0.00	0.06	0.00	0.00
P-286	J-46	J-21	100.21	0.01	0.00	0.27	0.07	0.06
P-29	J-13	J-14	7.05	0.01	0.00	0.04	0.00	0.00
P-3	J-4	J-70	-34.32	0.00	0.00	0.09	0.01	0.01
P-30	J-86	J-82	8.86	0.00	0.00	0.05	0.00	0.00
P-31	J-15	J-10	-10.74	0.01	0.00	0.06	0.01	0.01
P-32	J-15	J-7	-4.39	0.00	0.00	0.03	0.00	0.00
P-33	J-87	J-44	6.01	0.00	0.00	0.04	0.00	0.00
P-34	J-16	J-15	-5.13	0.00	0.00	0.03	0.00	0.00
P-35	J-16	J-17	-7.78	0.01	0.00	0.05	0.00	0.00
P-36	J-88	J-89	9.64	0.00	0.00	0.06	0.01	0.01
P-37	J-57	J-58	12.93	0.00	0.00	0.08	0.01	0.01
P-38	J-18	J-19	-4.58	0.00	0.00	0.03	0.00	0.00
P-39	J-58	J-67	4.75	0.00	0.00	0.03	0.00	0.00
P-4	J-50	J-31	12.38	0.00	0.00	0.07	0.01	0.01
P-40	J-67	J-85	2.05	0.00	0.00	0.01	0.00	0.00
P-41	J-20	J-21	-61.08	0.03	0.00	0.36	0.18	0.17
P-42	J-85	J-86	1.64	0.00	0.00	0.01	0.00	0.00
P-43	J-86	J-87	-6.78	0.00	0.00	0.04	0.00	0.00
P-44	J-22	J-20	-36.66	0.03	0.00	0.22	0.07	0.07
P-45	J-87	J-88	-14.17	0.00	0.00	0.08	0.01	0.01
P-46	J-23	J-22	-18.23	0.01	0.00	0.11	0.02	0.02
P-47	J-89	J-49	5.83	0.00	0.00	0.03	0.00	0.00
P-48	J-18	J-23	-3.92	0.00	0.00	0.02	0.00	0.00
P-49	J-23	J-76	8.51	0.00	0.00	0.05	0.00	0.00
P-5	J-69	J-50	15.01	0.01	0.00	0.09	0.01	0.01
P-50	J-90	J-80	-9.44	0.00	0.00	0.06	0.01	0.01
P-51	J-25	J-71	-6.85	0.00	0.00	0.04	0.00	0.00
P-52	J-91	J-65	4.46	0.00	0.00	0.03	0.00	0.00
P-53	J-89	J-90	-4.44	0.00	0.00	0.03	0.00	0.00
P-54	J-90	J-91	-3.07	0.00	0.00	0.02	0.00	0.00
P-55	J-17	J-12	-18.46	0.01	0.00	0.11	0.02	0.02
P-56	J-26	J-17	-2.79	0.00	0.00	0.02	0.00	0.00
P-57	J-24	J-19	-14.25	0.00	0.00	0.09	0.01	0.01
P-58	J-27	J-24	-14.16	0.00	0.00	0.08	0.01	0.01
P-59	J-92	J-61	-22.89	0.02	0.00	0.14	0.03	0.03
P-6	J-71	J-72	-9.30	0.00	0.00	0.06	0.01	0.01
P-60	J-25	J-27	11.08	0.00	0.00	0.07	0.01	0.01
P-61	J-28	J-25	5.82	0.00	0.00	0.03	0.00	0.00
P-62	J-93	J-91	17.53	0.01	0.00	0.10	0.02	0.02

P-63	J-29	J-20	-18.80	0.03	0.00	0.11	0.02	0.02
P-64	J-88	J-92	-18.29	0.01	0.00	0.11	0.02	0.02
P-65	J-92	J-93	-17.30	0.00	0.00	0.10	0.02	0.02
P-66-CV	PR-2	J-46	191.04	0.07	0.01	0.51	0.22	0.20
P-67	J-30	J-69	17.82	0.00	0.00	0.11	0.02	0.02
P-69	J-31	J-32	62.27	0.01	0.00	0.17	0.03	0.03
P-7	J-72	J-22	-12.46	0.00	0.00	0.07	0.01	0.01
P-71	J-33	J-32	-74.81	0.02	0.00	0.20	0.04	0.04
P-8	J-73	J-74	-14.04	0.01	0.00	0.08	0.01	0.01
P-81	J-29	J-28	25.90	0.01	0.00	0.15	0.04	0.04
P-82	J-30	J-29	10.08	0.00	0.00	0.06	0.01	0.01
P-83	J-36	J-30	28.78	0.01	0.00	0.17	0.04	0.04
P-84	J-32	J-28	-16.05	0.02	0.00	0.10	0.01	0.01
P-87	J-5	J-67	-4.31	0.00	0.00	0.03	0.00	0.00
P-9	J-74	J-8	-25.63	0.05	0.00	0.15	0.04	0.03
P-92	J-38	J-39	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-40	J-85	-5.56	0.00	0.00	0.03	0.00	0.00

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		5.26	802.65	646.90	155.75	67.49
J-10		6.49	802.58	665.57	137.01	59.37
J-11		0.53	802.58	666.78	135.80	58.85
J-12		1.05	802.58	666.41	136.17	59.01
J-13		8.60	802.60	650.77	151.83	65.79
J-14		16.67	802.59	663.73	138.86	60.17
J-15		10.00	802.57	660.87	141.71	61.41
J-16		11.41	802.57	659.23	143.34	62.12
J-17		7.90	802.58	663.22	139.36	60.39
J-18		10.00	802.57	662.56	140.01	60.67
J-19		5.97	802.57	668.34	134.24	58.17
J-2		1.25	802.65	648.06	154.59	66.99
J-20		5.62	802.61	657.89	144.71	62.71
J-21		4.04	802.64	657.51	145.13	62.89
J-22		5.97	802.58	658.30	144.28	62.52
J-23		5.79	802.57	662.32	140.25	60.77
J-24		2.11	802.57	664.89	137.68	59.66
J-25		1.58	802.57	665.93	136.64	59.21
J-26		5.79	802.58	666.12	136.46	59.13
J-27		4.91	802.57	665.03	137.54	59.60
J-28		4.04	802.57	665.85	136.72	59.25
J-29		2.98	802.58	664.95	137.63	59.64
J-3		0.00	802.77	648.42	154.34	66.88
J-30		0.88	802.58	665.84	136.74	59.25
J-31		0.70	802.57	642.05	160.52	69.56
J-32		3.51	802.55	651.80	150.75	65.33
J-33		4.39	802.54	649.84	152.70	66.17
J-34		0.00	802.50	645.38	157.12	68.08
J-35		1.10	802.50	640.76	161.73	70.08
J-36		5.48	802.59	665.80	136.79	59.27
J-37		7.06	802.51	650.49	152.01	65.87
J-38		6.88	802.50	648.18	154.32	66.87
J-39		0.00	802.50	655.00	147.50	63.92

J-4		0.00	802.65	646.84	155.80	67.51
J-40		7.72	802.49	641.08	161.41	69.95
J-41		7.06	802.52	650.63	151.89	65.82
J-42		0.53	802.49	642.94	159.55	69.14
J-43		6.18	802.50	648.38	154.12	66.79
J-44		8.25	802.49	640.70	161.79	70.11
J-45		0.18	802.63	655.58	147.05	63.72
J-46	EC-SOCWA	5.97	802.64	658.00	144.64	62.68
J-47	EC-Ferndale	0.00	802.50	641.36	161.13	69.82
J-48		0.00	802.50	642.16	160.33	69.48
J-49		2.81	802.49	643.24	159.25	69.01
J-5		5.79	802.49	642.66	159.83	69.26
J-50	1F	2.63	802.57	661.00	141.57	61.35
J-51		8.07	802.66	648.00	154.66	67.02
J-52		9.13	802.50	654.88	147.62	63.97
J-53		0.00	802.50	655.33	147.18	63.78
J-54		0.00	802.50	653.00	149.50	64.78
J-55		0.00	802.52	650.63	151.90	65.82
J-56		3.31	802.51	646.80	155.71	67.47
J-57		0.00	802.50	641.00	161.50	69.98
J-58		9.13	802.49	644.00	158.49	68.68
J-59		0.99	802.60	649.53	153.06	66.33
J-6		0.00	802.49	643.53	158.96	68.88
J-60		0.00	802.65	648.00	154.65	67.01
J-61		4.18	802.52	649.02	153.50	66.51
J-62	EC-Ferndale	0.35	802.49	643.00	159.49	69.11
J-63	EC-Ferndale	0.00	802.60	648.19	154.41	66.91
J-64		3.07	802.55	647.71	154.83	67.10
J-65		4.46	802.49	642.19	160.30	69.46
J-66		0.00	802.65	646.83	155.82	67.52
J-67		11.93	802.49	645.00	157.49	68.25
J-68		0.00	802.65	648.00	154.65	67.01
J-69	1R	2.81	802.58	663.00	139.58	60.48
J-7		4.21	802.57	658.64	143.93	62.37
J-70		0.00	802.65	648.00	154.65	67.02
J-71	2F	2.46	802.57	665.00	137.57	59.61
J-72	2R	3.16	802.58	662.00	140.58	60.92
J-73	3F	4.04	802.57	657.00	145.57	63.08
J-74	3R	11.58	802.58	654.00	148.58	64.38
J-75	4F	3.33	802.57	663.00	139.57	60.48
J-76	4R	3.16	802.57	661.00	141.57	61.35
J-77	5F	0.00	802.50	648.00	154.50	66.95
J-78	5R	0.00	802.51	647.00	155.51	67.39
J-79	6R	3.86	802.49	641.00	161.49	69.98
J-8		9.30	802.63	654.08	148.56	64.37
J-80	6F	5.26	802.49	645.00	157.49	68.25
J-81	7R	4.74	802.49	641.00	161.49	69.98
J-82	7F	7.72	802.49	640.00	162.49	70.41
J-83	8F	6.14	802.49	642.00	160.49	69.55
J-84	8R	6.14	802.49	644.00	158.49	68.68
J-85		14.57	802.49	645.00	157.49	68.25
J-86		8.60	802.49	644.00	158.49	68.68
J-87		11.76	802.49	644.00	158.49	68.68
J-88		8.42	802.50	645.00	157.50	68.25
J-89		8.25	802.49	642.00	160.49	69.55
J-9		1.40	802.57	659.92	142.65	61.82
J-90		3.86	802.49	643.00	159.49	69.11

J-91		10.00	802.49	643.00	159.49	69.11
J-92		7.20	802.50	644.00	158.50	68.68
J-93		7.55	802.51	644.00	158.51	68.69
PR-1	PR-1	----	802.77	648.00	154.77	67.07
PR-2		----	802.72	658.00	144.72	62.71

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-82	70.41	J-19	58.17
J-44	70.11	J-11	58.85
J-35	70.08	J-12	59.01
J-57	69.98	J-26	59.13
J-79	69.98	J-25	59.21

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-269	0.88	P-126	0.00
P-255	0.67	P-201	0.00
P-268	0.61	P-264	0.00
P-192	0.54	P-25	0.00
P-2	0.54	P-1	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-269	3.53	P-126	0.00
P-255	0.41	P-201	0.00
P-268	0.28	P-264	0.00
P-192	0.28	P-1	0.00
P-2	0.28	P-25	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-269	0.69	P-126	0.00
P-255	0.41	P-201	0.00
P-268	0.28	P-264	0.00
P-192	0.28	P-1	0.00
P-2	0.28	P-25	0.00

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
PR-1	228.19	PR-1
PR-2	191.04	

NET SYSTEM INFLOW = 419.23
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 419.23

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FireFlow/Hydrant Report
Fireflow/Hydrant Report:

Specified Minimum Pressure(psi or kPa): 20.0
Minimum Static Pressure(psi or kPa) : 20.0
Sp.Min Pres@FirePump Suctn(psi or kPa): 0.0

Flow-1: Flowrate to maintain the specified pressure at (hydrant) node
Node-2: Node that has a lower pressure than specified value at Flow-1
Flow-2: Flowrate to maintain the specified pressure at Node-2
Flow-3: Flowrate to maintain the specified pressure at Fire Pump Suction
(Flow-3 is based on combined value of hydrant and hose constants)

Hose Constant = 0.00

Hydrant Node	Hydrant Constant	Elevation	Demand gpm	Static Pressure	Flow-1 gpm	Flow-2 gpm	Node-2
J-1	0.0	646.9	5.3	67.5	7332.9	7291.2	J-2
J-10	0.0	665.6	6.5	59.4	4804.3	4769.3	J-11
J-11	0.0	666.8	0.5	58.8	2794.2		
J-12	0.0	666.4	1.1	59.0	5421.2		
J-13	0.0	650.8	8.6	65.8	6266.3		
J-14	0.0	663.7	16.7	60.2	5545.4		
J-15	0.0	660.9	10.0	61.4	4206.0		
J-16	0.0	659.2	11.4	62.1	4752.9		
J-17	0.0	663.2	7.9	60.4	5272.7		
J-18	0.0	662.6	10.0	60.7	4929.8		
J-19	0.0	668.3	6.0	58.2	5436.6		
J-2	0.0	648.1	1.2	67.0	7051.3		
J-20	0.0	657.9	5.6	62.7	6789.3		
J-21	0.0	657.5	4.0	62.9	10324.1		
J-22	0.0	658.3	6.0	62.5	5504.5		
J-23	0.0	662.3	5.8	60.8	5096.3		
J-24	0.0	664.9	2.1	59.7	5797.0		
J-25	0.0	665.9	1.6	59.2	5688.8		
J-26	0.0	666.1	5.8	59.1	5517.6		
J-27	0.0	665.0	4.9	59.6	5838.7		
J-28	0.0	665.9	4.0	59.2	5883.2		
J-29	0.0	664.9	3.0	59.6	6144.7		
J-3	0.0	648.4	0.0	66.9	54049.0		

J-30	0.0	665.8	0.9	59.3	6420.7		
J-31	0.0	642.1	0.7	69.6	7538.2	7271.8	J-50
J-32	0.0	651.8	3.5	65.3	7109.5		
J-33	0.0	649.8	4.4	66.2	6829.2		
J-34	0.0	645.4	0.0	68.1	4623.8		
J-35	0.0	640.8	1.1	70.1	3917.5	3891.5	J-48
J-36	0.0	665.8	5.5	59.3	7337.2		
J-37	0.0	650.5	7.1	65.9	5813.6	5754.8	J-52
J-38	0.0	648.2	6.9	66.9	4544.4	4384.6	J-39
J-39	0.0	655.0	0.0	63.9	2435.0		
J-4	0.0	646.8	0.0	67.5	7367.9	7325.9	J-2
J-40	0.0	641.1	7.7	69.9	4831.0		
J-41	0.0	650.6	7.1	65.8	6329.2		
J-42	0.0	642.9	0.5	69.1	4767.6		
J-43	0.0	648.4	6.2	66.8	5119.6	5032.4	J-39
J-44	0.0	640.7	8.2	70.1	4582.5		
J-45	0.0	655.6	0.2	63.7	6093.0		
J-46	0.0	658.0	6.0	62.7	12146.7		
J-47	0.0	641.4	0.0	69.8	3719.9		
J-48	0.0	642.2	0.0	69.5	2350.6		
J-49	0.0	643.2	2.8	69.0	3918.3		
J-5	0.0	642.7	5.8	69.3	4703.6		
J-50	0.0	661.0	2.6	61.3	4480.9		
J-51	0.0	648.0	8.1	67.0	11154.1		
J-52	0.0	654.9	9.1	64.0	5258.2		
J-53	0.0	655.3	0.0	63.8	5069.0		
J-54	0.0	653.0	0.0	64.8	4797.7		
J-55	0.0	650.6	0.0	65.8	6476.5		
J-56	0.0	646.8	3.3	67.5	5599.8		
J-57	0.0	641.0	0.0	70.0	5129.0	5123.6	J-34
J-58	0.0	644.0	9.1	68.7	5087.2		
J-59	0.0	649.5	1.0	66.3	8261.2		
J-6	0.0	643.5	0.0	68.9	4653.0		
J-60	0.0	648.0	0.0	67.0	10308.0		
J-61	0.0	649.0	4.2	66.5	5987.5		
J-62	0.0	643.0	0.4	69.1	2168.0		
J-63	0.0	648.2	0.0	66.9	4347.7		
J-64	0.0	647.7	3.1	67.1	6786.8		
J-65	0.0	642.2	4.5	69.5	2217.9		
J-66	0.0	646.8	0.0	67.5	6844.9		
J-67	0.0	645.0	11.9	68.2	5285.5		
J-68	0.0	648.0	0.0	67.0	8195.9		
J-69	0.0	663.0	2.8	60.5	4586.9		
J-7	0.0	658.6	4.2	62.4	3164.4	3141.7	J-9
J-70	0.0	648.0	0.0	67.0	10821.2		
J-71	0.0	665.0	2.5	59.6	3710.1		
J-72	0.0	662.0	3.2	60.9	3712.5		
J-73	0.0	657.0	4.0	63.1	3058.5		
J-74	0.0	654.0	11.6	64.4	2949.6		
J-75	0.0	663.0	3.3	60.5	3626.5		
J-76	0.0	661.0	3.2	61.3	3752.1		
J-77	0.0	648.0	0.0	66.9	4575.7	4419.5	J-39
J-78	0.0	647.0	0.0	67.4	5611.1		
J-79	0.0	641.0	3.9	70.0	2352.9	2330.5	J-62
J-8	0.0	654.1	9.3	64.4	6935.2	6879.8	J-45
J-80	0.0	645.0	5.3	68.2	4210.4		
J-81	0.0	641.0	4.7	70.0	4491.3		

J-82	0.0	640.0	7.7	70.4	3993.3
J-83	0.0	642.0	6.1	69.5	4492.4
J-84	0.0	644.0	6.1	68.7	4873.3
J-85	0.0	645.0	14.6	68.2	5575.7
J-86	0.0	644.0	8.6	68.7	5549.5
J-87	0.0	644.0	11.8	68.7	5494.0
J-88	0.0	645.0	8.4	68.2	5491.3
J-89	0.0	642.0	8.2	69.5	4546.8
J-9	0.0	659.9	1.4	61.8	2384.4
J-90	0.0	643.0	3.9	69.1	4469.1
J-91	0.0	643.0	10.0	69.1	3855.5
J-92	0.0	644.0	7.2	68.7	5465.1
J-93	0.0	644.0	7.5	68.7	5064.1

APPENDIX J

Interim & Master Plan Capital Improvement Program

Includes:
Preliminary Engineering Estimate for Interim Capital Improvement Program Projects
Rough Budgetary Estimates for Master Plan Capital Improvement Program Projects
Water Distribution System Interim Capital Improvement Program Map Panels
Water Distribution System Master Plan Capital Improvement Program Map Panels

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PROJECT: **Water System Reliability Study**
2nd SOCWA Supply - 10 Mile & Oakdale

OWNER: Pleasant Ridge

PREPARED BY: Chris Frayer
DATE: 1/13/2015

CHECKED BY: Mike Smith
DATE:

PRELIMARY ESTIMATE

AEW PROJECT NO. 0175-0095

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main, DI, 8 inch	100	FT	$ 80.00	$ 8,000.00
Water Main, DI, 12 inch	100	FT	$ 120.00	$ 12,000.00
Meter Vault with Appurtenances, complete	1	EA	$400,000.00	$ 400,000.00
Pressure Reducing Valve Chamber, complete	1	EA	$400,000.00	$ 400,000.00
Gate Valve & Well	8	EA	$ 5,500.00	$ 44,000.00
Water Main Connection, 12 inch	1	EA	$ 15,000.00	$ 15,000.00
Controls & Telemetry	1	LS	$ 50,000.00	$ 50,000.00
Bond, Insurance & Mobilization, (Max. 3%)	1	LS	$ 29,970.00	$ 29,970.00
Project Cleanup	1	LS	$ 10,000.00	$ 10,000.00
Audio Visual Record of Construction Area	1	LS	$ 10,000.00	$ 10,000.00
Traffic Maintenance & Control	1	LS	$ 50,000.00	$ 50,000.00
			ESTIMATED CONSTRUCTION COST	$ 1,028,970.00
			10% Construction Contingency	$ 102,897.00
			TOTAL CONSTRUCTION COST	$ 1,131,867.00
			CONSTRUCTION COST	$ 1,131,867.00
			Engineering Design Fee 6.2%	$ 70,328.00
			Design Survey 5%	$ 56,593.00
			Construction Observation 10%	$ 113,187.00
			Contract Administration 3%	$ 33,956.00
			As-Builts 1%	$ 5,659.00
			TOTAL COST	**$ 1,411,590.00**

Assumptions:
-Assume work will be under roadway Eastbound I-696 Service Drive and require road closure.
-No contact has been made with SOCWA regarding this proposed second connection.
-Supply connection would have an estimated demand of 80-330 gpm.
-AEW makes No assurances SOCWA would permit a second connection or this location would be permissible.

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PROJECT: **Water System Reliability Study**
Ridge - 10 Mile Rd to South City Limit

OWNER: Pleasant Ridge

PREPARED BY: Chris Frayer
DATE: 12/11/2015

PRELIMARY ESTIMATE

AEW PROJECT NO. 0175-0095

CHECKED BY: Mike Smith
DATE: 12/11/2015

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main, DI, 8 inch	2525	FT	$ 80.00	$ 202,000.00
1" Short Side Waste Service Replacement	22	EA	$ 1,500.00	$ 33,000.00
1" Long Side Water Service Replacement	7	EA	$ 2,000.00	$ 14,000.00
Gate Valve & Well	17	EA	$ 3,500.00	$ 59,500.00
Water Main Connection, 8 inch	12	EA	$ 3,250.00	$ 39,000.00
Hydrant Assembly	7	EA	$ 3,800.00	$ 26,600.00
Bond, Insurance & Mobilization, (Max. 3%)	1	LS	$ 12,048.00	$ 12,048.00
Project Cleanup	1	LS	$ 10,000.00	$ 10,000.00
Audio Visual Record of Construction Area	1	LS	$ 7,500.00	$ 7,500.00
Traffic Maintenance & Control	1	LS	$ 10,000.00	$ 10,000.00
			TOTAL CONSTRUCTION COST	$ 413,648.00
			10% Construction Contingency	$ 41,365.00
			TOTAL CONSTRUCTION COST	$ 455,013.00

CONSTRUCTION COST		$ 455,013.00
Engineering Design Fee	7.3%	$ 33,305.00
Design Survey	5%	$ 22,751.00
Construction Observation	10%	$ 45,501.00
Contract Administration	3%	$ 13,650.00
As-Builts	1%	$ 2,275.00
TOTAL COST		**$ 572,495.00**

Assumptions:
-Assume water main will be under roadway, overhead utilities in West greenbelt
-Driveway approaches, Pavement Repair, ADA Ramps & greenbelt restoration part of Ridge Road Replacement Project

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PROJECT: **Water System Reliability Study**
Indiana - 10 Mile Road to Woodward Heights

OWNER: Pleasant Ridge

PREPARED BY: Chris Frayer
DATE: 12/11/2015

PRELIMARY ESTIMATE

AEW PROJECT NO. 0175-0095

CHECKED BY: Mike Smith
DATE: 12/11/2015

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main, DI, 8 inch	2325	FT	$ 80.00	$ 186,000.00
Gate Valve & Well	16	EA	$ 3,500.00	$ 56,000.00
Water Main Connection, 8 inch	9	EA	$ 3,250.00	$ 29,250.00
Hydrant Assembly	6	EA	$ 3,800.00	$ 22,800.00
Bond, Insurance & Mobilization, (Max. 3%)	1	LS	$ 9,647.00	$ 9,647.00
Project Cleanup	1	LS	$ 10,000.00	$ 10,000.00
Audio Visual Record of Construction Area	1	LS	$ 7,500.00	$ 7,500.00
Traffic Maintenance & Control	1	LS	$ 10,000.00	$ 10,000.00
		TOTAL CONSTRUCTION COST		$ 331,197.00
		10% Construction Contingency		$ 33,120.00
		TOTAL CONSTRUCTION COST		$ 364,317.00
		CONSTRUCTION COST		$ 364,317.00
		Engineering Design Fee	7.6%	$ 27,778.00
		Design Survey	5%	$ 18,216.00
		Construction Observation	10%	$ 36,432.00
		Contract Administration	3%	$ 10,930.00
		As-Builts	1%	$ 1,822.00
			TOTAL COST	**$ 459,495.00**

Assumptions:
-Assume water main will be under roadway
-Driveway approaches, Pavement Repair, ADA Ramps & greenbelt restoration part of Indiana Road Replacement Project

ANDERSON, ECKSTEIN & WESTRICK, INC.
51301 Schoenherr Road
Shelby Township, MI 48315
Phone: 586-726-1234
Fax No: 586-726-8780

PROJECT: **Water System Reliability Study**
Bermuda - Sylvan to Woodward Heights

OWNER: Pleasant Ridge

PREPARED BY: Chris Frayer
DATE: 12/11/2015

CHECKED BY: Mike Smith
DATE: 12/11/2015

PRELIMARY ESTIMATE

AEW PROJECT NO. 0175-0095

WORK ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
Water Main, DI, 8 inch	615	FT	$ 80.00	$ 49,200.00
Gate Valve & Well	4	EA	$ 3,500.00	$ 14,000.00
Water Main Connection, 8 inch	3	EA	$ 3,250.00	$ 9,750.00
Hydrant Assembly	2	EA	$ 3,800.00	$ 7,600.00
Bond, Insurance & Mobilization, (Max. 3%)	1	LS	$ 3,242.00	$ 3,242.00
Project Cleanup	1	LS	$ 10,000.00	$ 10,000.00
Audio Visual Record of Construction Area	1	LS	$ 7,500.00	$ 7,500.00
Traffic Maintenance & Control	1	LS	$ 10,000.00	$ 10,000.00
			TOTAL CONSTRUCTION COST	$ 111,292.00
			10% Construction Contingency	$ 11,129.00
			TOTAL CONSTRUCTION COST	$ 122,421.00
			CONSTRUCTION COST	$ 122,421.00
			Engineering Design Fee 8.9%	$ 10,906.00
			Design Survey 5%	$ 6,121.00
			Construction Observation 10%	$ 12,242.00
			Contract Administration 3%	$ 3,673.00
			As-Builts 1%	$ 612.00
			TOTAL COST	**$ 155,975.00**

Assumptions:
-Assume water main will be under roadway
-Driveway approaches, Pavement Repair, ADA Ramps & greenbelt restoration part of Bermuda Road Replacement Project

City of Huntington Woods

City of Royal Oak

City of Oak Park

PR-2

12" P-22 (CIP #1)

CV-1

ADDITIONAL SOCWA SUPPLY

I-696

I-696 SERVICE DR.

12" P-130

12" P-120

J-54 12" P-157 12" P-285

J-53 J-39

12" P-271

6" P-174

J-52

12" P-175

10" P-82

J-37

J-36

J-31

10" P-83

8" P-4

MILLINGTON RD. (50')

8" P-67

8" P-5

J-30

J-69

J-50

MAIN STREET

WOODWARD AVE. (M-1)

12" P-69

J-45 12" P-126 J-8 12" P-125 J-21 12" P-286 J-46

11-d-9

WOODSIDE PARK BLVD. (80')

8" P-63

J-29

10" P-81

POPLAR PARK AVE. (100')

6" P-84

J-32

J-20

J-28

10" P-61

12" P-71

KENBERTON DR. (50')

KENBERTON DR. (60')

RIDGE RD. (50')

6" P-6

6" P-51

J-71

J-72

6" P-7

J-22

J-25

10" P-60

ELM PARK AVE. (100')

8" P-149

J-27

J-24

6-d-8

MAHLEFELD RD (50')

OAKDALE BLVD.

9-d-9

ELM PARK AVE. (50')

J-75

6" P-10

J-76

6" P-11

6" P-49

J-23

10" P-57

8-d-9

NORWICH RD. (50')

OAKLAND PARK

(100')

ANDERSON, ECKSTEIN AND WESTRICK, INC.

Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586-726-1234 Fax 586-726-8780

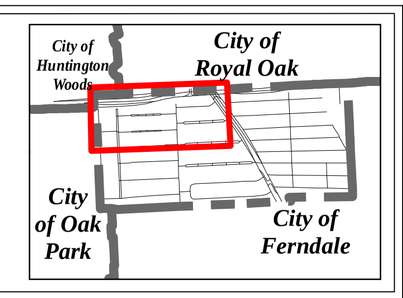
PLOT DATE: January 14, 2016	DRAWING DATE: December 17, 2015
PLOT SCALE: NTS	DRAWING SCALE: 24" x 36"
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHK'D BY: GIS DEPT

CITY OF PLEASANT RIDGE INCORPORATED 1928 SEAL OAKLAND COUNTY MICHIGAN

- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement

CITY of PLEASANT RIDGE

INTERIM WATER MAIN IMPROVEMENT PLAN (Year 1-5)



PANEL NUMBER: 1

CAUTION

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City of Royal Oak

City of Ferndale

I-696 SERVICE DR.

I-696

EMERGENCY CONNECTION TO FERNDALE

J-54 J-53 J-39 J-52 J-37 J-32 J-41 J-55 J-33 J-38 J-77 J-43 J-34 J-35 J-47 J-6 J-83 J-84 J-48 J-5 J-40 J-82 J-81 J-42 J-44

12" P-157 12" P-271 12" P-175 12" P-69 6" P-84 12" P-71 12" P-172 12" P-171 12" P-170 8" P-149 10" P-189 10" P-197 12" P-285 6" P-174 12" P-264 12" P-148 6" P-156 6" P-152 6" P-21 6" P-13 6" P-87 6" P-155 6" P-97 6" P-154 6" P-17 6" P-18 6" P-103 6" P-178 6" P-107 6" P-265 10" P-92

MAIN STREET

EDWARD AVE. (M-1)

KENSINGTON BLVD. (60')

DEVONSHIRE RD. (60')

INDIANA AVE.

WELLESLEY DR. (60')

EPRIZE DR. (50')

CANADIAN NATIONAL RAIL ROAD

AMHERST RD. (60)

MAYWOOD AVE. (60')

GAINSBORO AVE.

ELM PARK AVE. (100')

24280 24242 24200 24126 24100 24060 24072 24028 24025

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586-726-1234 Fax 586-726-8760

PLOT DATE: January 14, 2016	DRAWING DATE: December 17, 2015
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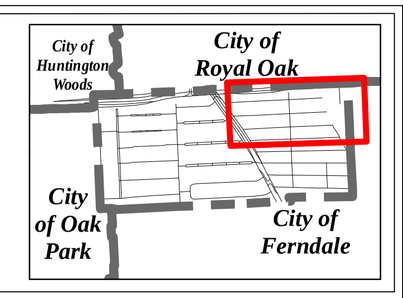
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHKD BY: GIS DEPT

PLEASANT RIDGE CITY OAKLAND COUNTY MICHIGAN SEAL INCORPORATED 1928

- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement

CITY of PLEASANT RIDGE

INTERIM WATER MAIN IMPROVEMENT PLAN (Year 1-5)



PANEL NUMBER: 2

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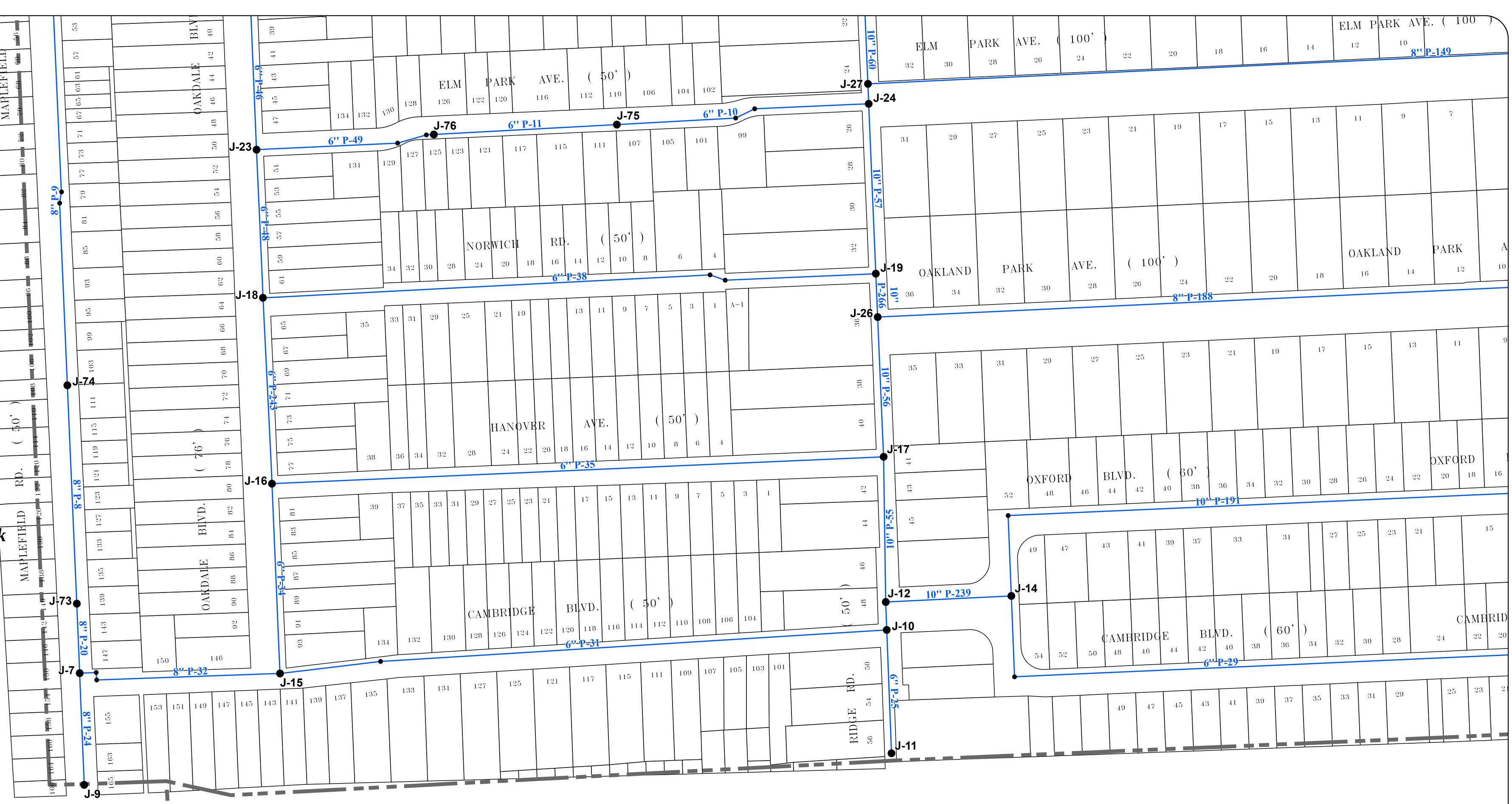

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Phone 586-726-1234 Fax 586-726-8780

PLOT DATE: January 14, 2016	DRAWING DATE: December 17, 2015
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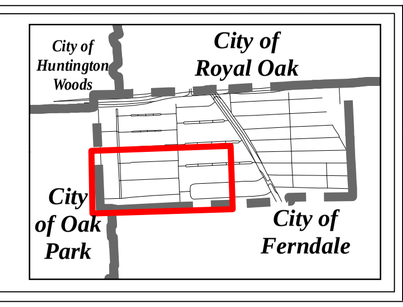
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHK'D BY: GIS DEPT

- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement

CITY of PLEASANT RIDGE

INTERIM WATER MAIN IMPROVEMENT PLAN (Year 1-5)



PANEL NUMBER: **3**

CAUTION

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City of Ferndale

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586-726-1234 Fax 586-726-8780

PLOT DATE: January 14, 2016	DRAWING DATE: December 17, 2015
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SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
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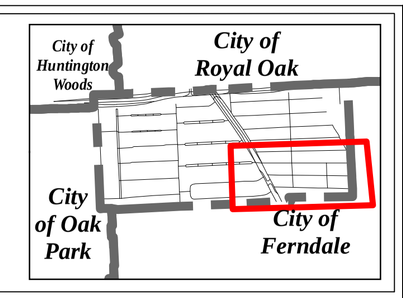
- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement

CITY of PLEASANT RIDGE

INTERIM WATER MAIN IMPROVEMENT PLAN (Year 1-5)



PANEL NUMBER: **4**

CAUTION

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City of Huntington Woods

City of Royal Oak

City of Oak Park

PR-2

12" P-66 (CIP #1)

CV-1

ADDITIONAL SOCWA SUPPLY

I-696

I-696 SERVICE DR.

12" P-130

12" P-120

12" P-125

12" P-126

12" P-286

8" P-63

8" P-83 (CIP #3)

8" P-82 (CIP #3)

8" P-81 (CIP #3)

8" P-61 (CIP #3)

8" P-60 (CIP #3)

8" P-57 (CIP #3)

8" P-67

8" P-5

8" P-4

12" P-69

12" P-71

6" P-84

8" P-149

12" P-157

12" P-285

12" P-271

6" P-174

12" P-175

10" P-82

6" P-6

6" P-7

6" P-51

6" P-49

6" P-11

6" P-10

11"d-49

9"d-49

8"d-49

6"d-48

J-45 J-8 J-21 J-46 J-20 J-22 J-23 J-72 J-71 J-76 J-75 J-36 J-30 J-69 J-50 J-31 J-29 J-28 J-25 J-27 J-24 J-32 J-54 J-53 J-39 J-52 J-37

WOODSIDE PARK BLVD. (80')

KENBERTON DR. (60')

KENBERTON DR. (50')

ELM PARK AVE. (50')

NORWICH RD. (50')

RIDGE RD. (50')

MILLINGTON RD. (50')

POPLAR PARK AVE. (100')

ELM PARK AVE. (100')

OAKLAND PARK AVE. (100')

WOODWARD AVE. (M-1)

MAIN STREET

MAHLEFELD RD (50')

OAKDALE BLVD.

ANDERSON, ECKSTEIN AND WESTRICK, INC.
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51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586-726-1234 Fax 586-726-8780

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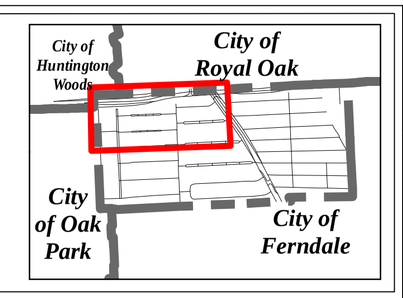
CITY OF PLEASANT RIDGE SEAL — INCORPORATED 1928 — OAKLAND COUNTY MICHIGAN

- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement
- 6-20 Year Improvement

CITY of PLEASANT RIDGE

MASTER WATER MAIN IMPROVEMENT PLAN (Year 5-20)



PANEL NUMBER: 1

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City of Royal Oak

City of Ferndale

I-696 SERVICE DR.

EMERGENCY CONNECTION TO FERNDALE

I-696

I-696 SERVICE DR.

MAIN STREET

EDWARD AVE. (M-1)

ELM PARK AVE. (100')

KENSINGTON BLVD. (60')

DEVONSHIRE RD. (60')

INDIANA AVE.

WELLESLEY DR. (60')

AMHERST RD. (60)

MAYWOOD AVE. (60')

EPRIZE DR. (50')

CANADIAN NATIONAL RAIL ROAD

GAINSBORO AVE.

GAINSBORO AVE.

J-54 12" P-157 J-53

12" P-271

J-39

12" P-285

J-57

12" P-22

J-34

12" P-264

J-35

12" P-148

J-47

6" P-174

J-58

J-84

6" P-21

J-83

6" P-156

J-6

6" P-152

J-48

J-52

12" P-175

10" P-92

6" P-26

J-67

6" P-87

J-5

6" P-13

J-37

6" P-84

J-32

12" P-69

12" P-172

6" P-28

J-85

6" P-97

J-40

6" P-155

J-41

12" P-71

12" P-171

J-55

12" P-170

6" P-154

J-33

8" P-149

6" P-103

J-77

J-86

6" P-30

J-82

6" P-18

J-81

6" P-17

J-42

J-38

10" P-189

6" P-107

J-87

6" P-33

J-44

6" P-178

J-43

10" P-197

6" P-265

8" P-37 (CIP #4)

8" P-39 (CIP #9)

8" P-40 (CIP #3)

8" P-42 (CIP #4)

8" P-43 (CIP #9)

8" P-45 (CIP #4)

ANDERSON, ECKSTEIN AND WESTRICK, INC.
Civil Engineers • Surveyors • Architects
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586-726-1234 Fax 586-726-8760

PLOT DATE: January 14, 2016	DRAWING DATE: December 17, 2015
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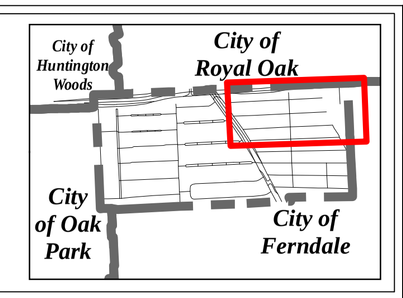
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHKD BY: GIS DEPT

- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement
- 6-20 Year Improvement

CITY of PLEASANT RIDGE

MASTER WATER MAIN IMPROVEMENT PLAN (Year 5-20)



PANEL NUMBER: **2**

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PLOT DATE: January 14, 2016	DRAWING DATE: December 17, 2015
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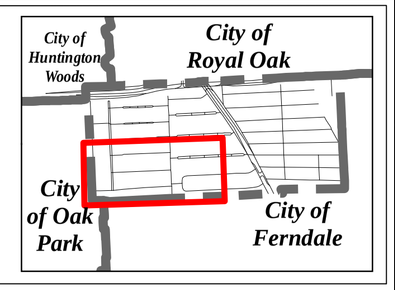
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHKD BY: GIS DEPT

- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement
- 6-20 Year Improvement

CITY of PLEASANT RIDGE

MASTER WATER MAIN IMPROVEMENT PLAN (Year 5-20)



PANEL NUMBER: 3

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City of Ferndale

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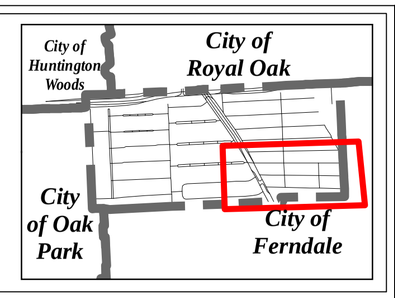
51301 Schoenherr Road, Shelby Township, Michigan 48315
Phone 586-726-1234 Fax 586-726-8780

PLOT DATE: January 14, 2016	DRAWING DATE: December 17, 2015
PLOT SCALE: NTS	DRAWING SCALE: 24" x 36"
PLOT CONFIG:	PROJECT NO: 0175-0095
SCRIPT FILE:	FILE NAME: Water Basemap 24X36.mxd
ATTACH XREF:	DRAWN BY: GIS DEPT / CHK'D BY: GIS DEPT

- Intermediate Node
- Node
- Water Main
- 1-5 Year Improvement
- 6-20 Year Improvement

CITY of PLEASANT RIDGE

MASTER WATER MAIN IMPROVEMENT PLAN (Year 5-20)



PANEL NUMBER: **4**

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City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, Michigan 48069

NOTICE IS HEREBY GIVEN that the Pleasant Ridge City Commission will hold a public hearing to solicit comments and consider a Drinking Water Revolving Loan Fund (DWRF) Project Plan.

Copies of the DWRF Project Plan are posted on the City's website at cityofpleasantridge.org/water. Printed copies of the plan are available for review at Pleasant Ridge City Hall.

The public hearing will be held on Tuesday, June 14 at 7:30 pm in the City Commission chambers at Pleasant Ridge City Hall.

Written comments will be accepted until the day and time of the public hearing, and may be directed to:

Amy Allison, City Clerk
City of Pleasant Ridge
23925 Woodward Avenue
Pleasant Ridge, MI 48069
cityclerk@cityofpleasantridge.org

Arrangements to reasonably accommodate special needs, including handicap accessibility or interpreter, will be made upon receiving 72-hour advance notice. Contact the City Offices at (248)541-2901 for special services.

Amy M. Allison
City Clerk

Published: The Daily Tribune
May 8, 2022

City of Pleasant Ridge

James Breuckman, City Manager

From: Jim Breuckman, City Manager

To: City Commission

Date: June 9, 2022

Re: Woodward Cycle Track/Green Infrastructure Streetscape Project

Overview

The Woodward streetscape/cycle track project was put out to bid by MDOT. The bids came in 80% higher than the engineers estimate. The low bid was $2.7 million compared to an estimate of $1.6 million. The City had $1 million in grant funding, so our local match would have gone from $600,000 to $1.7 million. Clearly, this is not a cost the DDA (who is providing the matching funds for this project) can bear.

Refer to the attached memo from the City Engineer regarding the discrepancy.

Since the bids have come back, I have worked with SEMCOG and MDOT to explore options to address the increased costs we are seeing now compared to 2019 when this project was conceived. They have committed to funding 80% of the cycle track project cost. This cycle track project is important to SEMCOG, and they are motivated to help us see it through.

Of the total bid we received, MDOT classified $1,094,030 as related to TAP/Cycle Track costs, and $1,645,055 as related to EGLE/stormwater infiltration costs. We believe that this estimate allocates some costs wholly to the EGLE portion of the bid, and we are working with SEMCOG and MDOT to develop a more accurate cost estimate for the cycle track.

This means that we will be able to significantly increase our grant funding for the cycle track portion of this project, from $402,333 to at least $875,224 and very likely more. This will allow us to revise the plans and proceed with the cycle track portion of the project.

Local matching funds are available from the DDA. We had budgeted to be able to provide up to $650,000 of local matching funds for this project. Based on current cost estimates, our local match for the cycle track portion of the project is expected to be between $219,000 and $400,000, well within the funds the DDA has budgeted for this project. There will also be DDA funds left over for additional streetscape work along Woodward south of Sylvan as part of a separate project.

Background

The City received two grants in 2019 to improve the Woodward streetscape along northbound Woodward:

- EGLE 319 Stormwater Infiltration grant to refresh the Woodward streetscape and capture and infiltrate up to a 2-year storm.
    - $608,479 grant funding, $412,669 local match
- Transportation Alternatives Program (TAP) grant to implement a two-way cycle track from Sylvan to 696
    - $402,333 grant funding, $134,111 local match

In total, the two grants provided $1 million in grant funding, with $546,000 in local matching funds. These costs were based on 2019 construction prices.

Gaining approval of the plans was significantly delayed by the COVID-19 pandemic. It was not until March of 2022 that final approval of the plans was granted by MDOT. The plans were released for bids in April and came back on June 3. The bids we received were cost prohibitive, and we rejected them. Our options now are to re-bid the project as is this coming fall to try to get a more cost-effective bid, to revise the project and re-bid it this fall, or to cancel the project altogether.

Option 1: Re-Bid the Project As Is

The EGLE 319 grant expires on September 30, 2023. The project must be complete before that date or else our EGLE grant funding could be in jeopardy. Given that the EGLE project appears to have caused the majority of the bid overage, and that the EGLE funding has a hard deadline that we likely cannot meet if we rebid in the fall for spring construction, Option 1 is not one I can recommend.

Option 2: Revise the Project to Eliminate Stormwater Infiltration Items

Removing the stormwater infiltration items will allow us to proceed with only the cycle track portion of the project from Sylvan to 696. There would be some landscaping improvements to plant many new trees, but we would concentrate on accessing the increased grant funding available to us to complete this portion of the project while we can.

The streetscape improvements from the south City boundary to Sylvan could be completed as a separate project later. We can apply for additional grant funding to implement those improvements, either through a revised EGLE stormwater infiltration grant or other available grants.

This is the option we are currently pursuing.

Option 3: Cancel Project

The last option is to cancel the project. However, there are several reasons why we should not do this:

- SEMCOG and MDOT are bringing additional grant funds for the cycle track, which will keep our local match within budgeted amounts.

- The DDA is providing the matching funds and has been supporting this project for years. This project is not using funds that can be used for other purposes, such as water infrastructure. The DDA funds must be spent within the DDA area.

- The Sylvan to 696 cycle track is an important part of the regional bike network, and it will be a demonstration of how top-quality bicycle infrastructure looks and functions for the region.

Requested Action

No action necessary.

The City Commission can provide comment and direction to staff and the DDA regarding its preference for how to proceed with the remainder of the non-cycle track portions of the streetscape project.

ANDERSON, ECKSTEIN & WESTRICK, INC.
CIVIL ENGINEERS - SURVEYORS - ARCHITECTS
51301 Schoenherr Road, Shelby Township, MI 48315
586.726.1234 | www.aewinc.com

MEMORANDUM

TO: James Breuckman, City Manger

FROM: Michael D. Smith, PE

DATE: June 8, 2022

SUBJECT: **Bid Results – Woodward Avenue Streetscape Project**

On June 3, 2022, the referenced project was let and two bids were received. The as-read bid results were as follows:

Bidder	As-Submittted
DiPonio Contracting, Inc.	$2,739,085.72
F.H. Paschen, S.N. Nielsen & Associates LLC	$3,081,388.79

The low bid came in 80.61% over the engineer's estimate. Items associated with landscaping, signage and pavement markings were generally on-point with the engineer's estimate. All other items included with the project including removals (sidewalk, pavement, clay brick pavers, and HMA), and hard surfaces (concrete pavement, sidewalk, colored concrete and permeable pavers) were consistently over the engineer's estimated unit prices. It would be inaccurate to pinpoint one item for the cause of the overage; a general explanation of the increased costs could be speculated as the current state of the economy (inflated market and material shortages), recent increases in fuel prices ($5-$6 per gallon), and upon discussion with the low bidder, the tedious nature of the Project. The low bidder expected lower productions rates due to the project location, and requirements of maintaining vehicular, pedestrian and business traffic. While we agree with the low bidder's general assessment of the tedious nature of the project, and anticipated slow production; we disagree with the wide disparity of their prices versus the engineer's estimate. This general nature of work, production rate, and above average traffic accommodation were reflected within the engineer's estimate.

There were 63 projects included on the June 3, 2022 MDOT bid letting. 23 of the bid results were between 10% – 50% over the engineer's estimate and 3 of the bid results were over 50% of the engineer's estimate, including this project. We have seen similar results over the last couple months on other federal and local funded projects.

Attached to this memorandum is the informal bid tabulation provided by MDOT for further review and discussion.

Low Bid Summary

Letting Date: June 03, 2022 **Letting ID:** 220603

Lowest Bidder

Call Number	Contract ID / Project(s)	Number of Bids	Low Bidder	Estimated Cost	Corrected Bid	Percent of Estimate	Overrun (+) Underrun (-)
018	63051-210934 22A0483	2	DiPonio Contracting, Inc.	$1,516,540.10	$2,739,085.72	180.61%	$1,222,545.62
	Letting Totals:	**2**		**$1,516,540.10**	**$2,739,085.72**	**180.61%**	**$1,222,545.62**

Tabulation of Bids

Call Number: 018 **Contract ID:** 63051-210934 **Project(s):** 22A0483

Letting Date: June 03, 2022 **Region(s):** Oakland TSC **Counties:** Oakland County

Contract Time: 09/19/24 COMPLETION DATE

Contract Description: 0.53 mi of concrete shared-use path, curb, gutter, sidewalk and ramps, storm drain and pavement markings on Woodward Avenue from Sylvan Avenue to Main Street and Main Street from Woodward Avenue to I-696 Service Drive in the city of Pleasant Ridge, Oakland County. This is a Local Agency project. ** 1490 Ea or Comb/Jt. 1490 H, J **In addition to the above minimum prequalification requirement for prime contractors this project includes subclassifications of Ea, H and J. If the prime contractor is not prequalified in those subclassifications it must use prequalified subcontractors. Those subcontractors must be designated prior to award of the contract to the confirmed low bidder.

List of Vendors

Rank	Vendor ID/Name	Total Bid	Percent Of Low Bid	Percent Of Estimate
0	-EST- - Engineer's Estimate	$1,516,540.10	55.37%	100.00%
1	06366 - DiPonio Contracting, Inc.	$2,739,085.72	100.00%	180.61%
2	02239 - F.H. Paschen, S.N. Nielsen & Associates LLC	$3,081,388.79	112.50%	203.19%

Tabulation of Bids

Line No / Item ID Item Description Alt Set / Alt Member	Quantity and Units	(0) Engineer's Estimate Unit Price	 Ext Amount	(1) DiPonio Contracting, Inc. Unit Price	 Ext Amount	(2) F.H. Paschen, S.N. Nielsen & Associates LLC Unit Price	 Ext Amount
Section ID/Descr: 1 - Road Work							
0005 1027051 _ Audio-Visual Record of Construction Area	(1) LSUM	3,000.00000	3,000.00	7,000.00000	7,000.00	5,000.00000	5,000.00
0010 1100001 Mobilization, Max $135,500.00	(1) LSUM	135,500.00000	135,500.00	135,500.00000	135,500.00	135,500.00000	135,500.00
0015 2020004 Tree, Rem, 6 inch to 18 inch	16.000 Ea	250.00000	4,000.00	675.00000	10,800.00	2,000.00000	32,000.00
0020 2030011 Dr Structure, Rem	9.000 Ea	500.00000	4,500.00	600.00000	5,400.00	750.00000	6,750.00
0025 2030015 Sewer, Rem, Less than 24 inch	116.000 Ft	20.00000	2,320.00	50.00000	5,800.00	50.00000	5,800.00
0030 2040020 Curb and Gutter, Rem	1,555.000 Ft	5.00000	7,775.00	20.00000	31,100.00	10.00000	15,550.00
0035 2040050 Pavt, Rem	3,262.000 Syd	8.00000	26,096.00	35.00000	114,170.00	15.00000	48,930.00

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0040 2040055 Sidewalk, Rem	2,214.000 Syd	5.00000	11,070.00	30.00000	66,420.00	10.00000	22,140.00
0045 2050016 Excavation, Earth	2,245.000 Cyd	7.50000	16,837.50	46.00000	103,270.00	75.00000	168,375.00
0050 2050023 Granular Material, Cl II	100.000 Cyd	20.00000	2,000.00	50.00000	5,000.00	110.00000	11,000.00
0055 2057002 _ Station Grading	54.000 Sta	3,000.00000	162,000.00	2,400.00000	129,600.00	8,000.00000	432,000.00
0060 2057021 _ Aggregate, 6A	1,175.000 Cyd	60.00000	70,500.00	115.00000	135,125.00	105.00000	123,375.00
0065 2057021 _ Granular Material, Cl II, Special	1,085.000 Cyd	15.00000	16,275.00	75.00000	81,375.00	52.00000	56,420.00
0070 2080020 Erosion Control, Inlet Protection, Fabric Drop	41.000 Ea	110.00000	4,510.00	150.00000	6,150.00	465.00000	19,065.00

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Section ID/Descr: 1 - Road Work							
0075 2090001 Project Cleanup	(1) LSUM	10,000.00000	10,000.00	30,000.00000	30,000.00	119,790.46000	119,790.46
0080 3062000 Driveway Maintenance, Commercial	2.000 Ea	700.00000	1,400.00	1,000.00000	2,000.00	5,000.00000	10,000.00
0085 3062002 Intersection Maintenance	4.000 Ea	700.00000	2,800.00	1,500.00000	6,000.00	12,000.00000	48,000.00
0090 4020030 Sewer, Cl A, 6 inch, Tr Det B	6.000 Ft	50.00000	300.00	250.00000	1,500.00	260.00000	1,560.00
0095 4020031 Sewer, Cl A, 8 inch, Tr Det B	8.000 Ft	65.00000	520.00	300.00000	2,400.00	172.00000	1,376.00
0100 4020600 Sewer, Cl E, 12 inch, Tr Det B	183.000 Ft	80.00000	14,640.00	200.00000	36,600.00	197.00000	36,051.00
0101 4021204 Sewer Tap, 12 inch	1.000 Ea	500.00000	500.00	1,000.00000	1,000.00	2,750.00000	2,750.00

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0105 4027001 _ Sewer, Cl A, Perforated, 6 inch, Tr Det B	822.000 Ft	50.00000	41,100.00	50.00000	41,100.00	41.00000	33,702.00
0110 4027001 _ Sewer, Cl A, Perforated, 8 inch, Tr Det B	572.000 Ft	65.00000	37,180.00	70.00000	40,040.00	47.00000	26,884.00
0115 4027001 _ Sewer, PVC, Sch. 40, 4 inch	119.000 Ft	30.00000	3,570.00	80.00000	9,520.00	108.00000	12,852.00
0120 4030005 Dr Structure Cover, Adj, Case 1	2.000 Ea	550.00000	1,100.00	2,200.00000	4,400.00	2,410.00000	4,820.00
0125 4030006 Dr Structure Cover, Adj, Case 2	3.000 Ea	550.00000	1,650.00	1,000.00000	3,000.00	905.00000	2,715.00
0130 4030200 Dr Structure, 24 inch dia	11.000 Ea	1,300.00000	14,300.00	3,500.00000	38,500.00	4,590.00000	50,490.00
0135 4030210 Dr Structure, 48 inch dia	10.000 Ea	2,400.00000	24,000.00	5,000.00000	50,000.00	4,500.00000	45,000.00

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0140 4030220 Dr Structure, 60 inch dia	1.000 Ea	4,000.00000	4,000.00	9,000.00000	9,000.00	6,000.00000	6,000.00
0145 4030280 Dr Structure, Adj, Add Depth	1.000 Ft	200.00000	200.00	1,000.00000	1,000.00	3,700.00000	3,700.00
0150 4030308 Dr Structure, Tap, 8 inch	1.000 Ea	400.00000	400.00	800.00000	800.00	2,450.00000	2,450.00
0151 4030312 Dr Structure, Tap, 12 inch	2.000 Ea	500.00000	1,000.00	1,250.00000	2,500.00	3,600.00000	7,200.00
0155 4037050 _ Dr Structure Cover, Storm	22.000 Ea	600.00000	13,200.00	800.00000	17,600.00	900.00000	19,800.00
0160 5010005 HMA Surface, Rem	2,242.000 Syd	5.00000	11,210.00	45.00000	100,890.00	30.00000	67,260.00
0165 6020106 Conc Pavt, Nonreinf, 9 inch	258.000 Syd	55.00000	14,190.00	95.00000	24,510.00	100.85000	26,019.30

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0170 6020201 Joint, Contraction, C3p	147.000 Ft	9.00000	1,323.00	5.00000	735.00	5.00000	735.00
0175 6030020 Joint, Contraction, Crg	90.000 Ft	12.00000	1,080.00	25.00000	2,250.00	25.00000	2,250.00
0180 6030021 Joint, Expansion, Erg	108.000 Ft	12.00000	1,296.00	25.00000	2,700.00	25.00000	2,700.00
0185 6030030 Lane Tie, Epoxy Anchored	76.000 Ea	9.50000	722.00	10.00000	760.00	10.00000	760.00
0190 6030050 Pavt Repr, Nonreinf Conc, 11 inch	98.000 Syd	75.00000	7,350.00	125.00000	12,250.00	132.70000	13,004.60
0195 8007001 _ Curb Inlet	59.000 Ft	50.00000	2,950.00	80.00000	4,720.00	84.93000	5,010.87
0200 8007050 _ Bench, Rem	4.000 Ea	500.00000	2,000.00	700.00000	2,800.00	825.00000	3,300.00

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Section ID/Descr: 1 - Road Work							
0205 8007050 _ Bike Rack, Rem	1.000 Ea	500.00000	500.00	700.00000	700.00	825.00000	825.00
0210 8010006 Driveway, Nonreinf Conc, 7 inch	217.000 Syd	45.00000	9,765.00	70.00000	15,190.00	74.31000	16,125.27
0215 8020035 Curb and Gutter, Conc, Det F1	493.000 Ft	21.00000	10,353.00	30.00000	14,790.00	31.85000	15,702.05
0220 8020039 Curb and Gutter, Conc, Det F5	1,499.000 Ft	21.00000	31,479.00	35.00000	52,465.00	37.16000	55,702.84
0225 8020050 Driveway Opening, Conc, Det M	147.000 Ft	21.00000	3,087.00	50.00000	7,350.00	53.08000	7,802.76
0230 8030010 Detectable Warning Surface	152.000 Ft	40.00000	6,080.00	65.00000	9,880.00	69.00000	10,488.00
0235 8030030 Curb Ramp Opening, Conc	275.000 Ft	24.00000	6,600.00	35.00000	9,625.00	37.16000	10,219.00

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0240 8030044 Sidewalk, Conc, 4 inch	15,665.000 Sft	4.50000	70,492.50	5.80000	90,857.00	6.16000	96,496.40
0245 8030051 Sidewalk, Clay Brick Pavers, Rem	15,050.000 Sft	1.00000	15,050.00	6.15000	92,557.50	2.00000	30,100.00
0250 8030100 Steps, Conc	4.000 Cyd	800.00000	3,200.00	2,885.00000	11,540.00	3,062.75000	12,251.00
0255 8032001 Curb Ramp, Conc, 4 inch	846.000 Sft	6.00000	5,076.00	9.50000	8,037.00	10.09000	8,536.14
0260 8037010 _ Curb Ramp, Conc, 8 inch	2,119.000 Sft	8.00000	16,952.00	12.00000	25,428.00	12.74000	26,996.06
0265 8037010 _ Curb Ramp, Conc, Decorative Colored, 4 inch	495.000 Sft	8.00000	3,960.00	14.00000	6,930.00	14.86000	7,355.70
0270 8037010 _ Curb Ramp, Conc, Decorative Colored, 8 inch	619.000 Sft	10.00000	6,190.00	16.00000	9,904.00	16.99000	10,516.81

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0275 8037010 _ Permeable Pavers	7,132.000 Sft	10.00000	71,320.00	30.00000	213,960.00	46.00000	328,072.00
0280 8037010 _ Sidewalk, Conc, Decorative Colored, 4 inch	11,070.000 Sft	7.50000	83,025.00	9.50000	105,165.00	10.09000	111,696.30
0281 8100010 Band, Sign	4.000 Ea	50.00000	200.00	200.00000	800.00	500.00000	2,000.00
0285 8100090 Cantilever, Rem	1.000 Ea	2,000.00000	2,000.00	2,000.00000	2,000.00	2,000.00000	2,000.00
0290 8100104 Cantilever, Type E	1.000 Ea	28,000.00000	28,000.00	40,000.00000	40,000.00	40,000.00000	40,000.00
0295 8100170 Fdn, Cantilever Sign Structure Type E, 48 inch Dia, Cased	26.000 Ft	1,200.00000	31,200.00	1,606.00000	41,756.00	1,606.00000	41,756.00
0300 8100190 Fdn, Cantilever, Rem	1.000 Ea	5,000.00000	5,000.00	2,500.00000	2,500.00	2,500.00000	2,500.00

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0305 8100371 Post, Steel, 3 lb	271.000 Ft	7.00000	1,897.00	8.00000	2,168.00	8.00000	2,168.00
0310 8100380 Post, Wood, 4 inch by 6 inch	56.000 Ft	25.00000	1,400.00	20.00000	1,120.00	20.00000	1,120.00
0315 8100390 Sign, Type I, Erect, Salv	1.000 Ea	150.00000	150.00	550.00000	550.00	550.00000	550.00
0320 8100402 Sign, Type III, Erect, Salv	2.000 Ea	50.00000	100.00	100.00000	200.00	100.00000	200.00
0325 8100403 Sign, Type III, Rem	23.000 Ea	12.00000	276.00	10.00000	230.00	10.00000	230.00
0330 8100404 Sign, Type IIIA	33.000 Sft	20.00000	660.00	21.00000	693.00	21.00000	693.00
0335 8100405 Sign, Type IIIB	246.000 Sft	20.00000	4,920.00	21.00000	5,166.00	21.00000	5,166.00

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0340 8102003 Sign, Type III, Rem, Salv	3.000 Ea	100.00000	300.00	150.00000	450.00	150.00000	450.00
0345 8110092 Pavt Mrkg, Polyurea, 4 inch, Yellow	1,659.000 Ft	2.00000	3,318.00	2.95000	4,894.05	3.26000	5,408.34
0350 8110105 Pavt Mrkg, Polyurea, Bike, Small Sym	28.000 Ea	60.00000	1,680.00	110.00000	3,080.00	121.53000	3,402.84
0355 8110110 Pavt Mrkg, Polyurea, 12 inch, Crosswalk	260.000 Ft	2.00000	520.00	5.75000	1,495.00	6.35000	1,651.00
0360 8110114 Pavt Mrkg, Polyurea, 24 inch, Stop Bar	50.000 Ft	5.00000	250.00	15.00000	750.00	16.57000	828.50
0365 8110195 Pavt Mrkg, Thermopl, 4 inch, White	493.000 Ft	2.00000	986.00	1.95000	961.35	2.15000	1,059.95
0370 8110417 Pavt Mrkg, Polyurea, Thru and Rt Turn Arrow Sym	1.000 Ea	60.00000	60.00	200.00000	200.00	220.96000	220.96

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Section ID/Descr: 1 - Road Work							
0375 8110418 Pavt Mrkg, Polyurea, Thru Arrow Sym	2.000 Ea	60.00000	120.00	150.00000	300.00	165.72000	331.44
0380 8110420 Pavt Mrkg, Polyurea, For On-Street Parking, 4 inch, White	170.000 Ft	2.00000	340.00	2.95000	501.50	3.26000	554.20
0385 8112170 Pavt Mrkg, Polyurea, Bike Thru Arrow Sym	28.000 Ea	60.00000	1,680.00	110.00000	3,080.00	121.53000	3,402.84
0390 8120012 Barricade, Type III, High Intensity, Double Sided, Lighted, Furn	37.000 Ea	80.00000	2,960.00	135.00000	4,995.00	160.31000	5,931.47
0395 8120013 Barricade, Type III, High Intensity, Double Sided, Lighted, Oper	37.000 Ea	5.00000	185.00	0.01000	0.37	0.01000	0.37
0400 8120026 Pedestrian Type II Barricade, Temp	4.000 Ea	150.00000	600.00	225.00000	900.00	267.18000	1,068.72
0405 8120027 Pedestrian Type II Channelizer, Temp	100.000 Ft	20.00000	2,000.00	45.00000	4,500.00	53.44000	5,344.00

Tabulation of Bids

Line No / Item ID Item Description Alt Set / Alt Member	Quantity and Units	(0) Engineer's Estimate Unit Price	 Ext Amount	(1) DiPonio Contracting, Inc. Unit Price	 Ext Amount	(2) F.H. Paschen, S.N. Nielsen & Associates LLC Unit Price	 Ext Amount
Section ID/Descr: 1 - Road Work							
0410 8120140 Lighted Arrow, Type C, Furn	5.000 Ea	500.00000	2,500.00	1,000.00000	5,000.00	1,187.48000	5,937.40
0415 8120141 Lighted Arrow, Type C, Oper	5.000 Ea	75.00000	375.00	0.01000	0.05	0.01000	0.05
0420 8120210 Pavt Mrkg, Longit, 6 inch or Less Width, Rem	836.000 Ft	0.60000	501.60	0.95000	794.20	1.05000	877.80
0425 8120245 Pavt Mrkg, Wet Reflective, Type R, Tape, 4 inch, White, Temp	5,350.000 Ft	2.50000	13,375.00	2.35000	12,572.50	2.60000	13,910.00
0430 8120252 Plastic Drum, Fluorescent, Furn	670.000 Ea	25.00000	16,750.00	45.00000	30,150.00	53.44000	35,804.80
0435 8120253 Plastic Drum, Fluorescent, Oper	670.000 Ea	1.00000	670.00	0.01000	6.70	0.01000	6.70
0440 8120350 Sign, Type B, Temp, Prismatic, Furn	450.000 Sft	25.00000	11,250.00	9.00000	4,050.00	10.69000	4,810.50

Tabulation of Bids

Line No / Item ID Item Description Alt Set / Alt Member	Quantity and Units	(0) Engineer's Estimate Unit Price	 Ext Amount	(1) DiPonio Contracting, Inc. Unit Price	 Ext Amount	(2) F.H. Paschen, S.N. Nielsen & Associates LLC Unit Price	 Ext Amount
Section ID/Descr: 1 - Road Work							
0445 8120351 Sign, Type B, Temp, Prismatic, Oper	450.000 Sft	20.00000	9,000.00	0.01000	4.50	0.01000	4.50
0450 8120370 Traf Regulator Control	(1) LSUM	7,500.00000	7,500.00	200,000.00000	200,000.00	89,000.00000	89,000.00
0455 8150001 Site Preparation, Max $45,600.00	(1) LSUM	45,600.00000	45,600.00	45,600.00000	45,600.00	46,294.42000	46,294.42
0460 8150002 Watering and Cultivating, First Season, Min $22,150.00	(1) LSUM	22,150.00000	22,150.00	35,000.00000	35,000.00	35,532.99000	35,532.99
0465 8150003 Watering and Cultivating, 2nd Season, Min $27,500.00	(1) LSUM	27,500.00000	27,500.00	39,000.00000	39,000.00	39,593.91000	39,593.91
0470 8151064 Cornus sericea, #5 cont.	29.000 Ea	75.00000	2,175.00	50.00000	1,450.00	50.76000	1,472.04
0475 8151274 Echinacea purpurpea 'Kim's Knee High', #1 cont.	501.000 Ea	20.00000	10,020.00	16.00000	8,016.00	16.24000	8,136.24

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0480 8151635 Ginko biloba 'Fastigiata', 2 inch	3.000 Ea	1,000.00000	3,000.00	650.00000	1,950.00	659.90000	1,979.70
0485 8152104 Liatris spicata 'Kobold', #1 cont.	33.000 Ea	20.00000	660.00	16.00000	528.00	16.24000	535.92
0490 8152513 Nyssa sylvatica, 2 inch	5.000 Ea	1,000.00000	5,000.00	650.00000	3,250.00	659.90000	3,299.50
0495 8152725 Physocarpus opulifolius, #3 cont.	117.000 Ea	55.00000	6,435.00	55.00000	6,435.00	55.84000	6,533.28
0500 8157050 _ Acer rubrum, 2.5 inch	1.000 Ea	1,000.00000	1,000.00	640.00000	640.00	649.75000	649.75
0505 8157050 _ Allium 'Purple Rain', 10 cm Bulb	48.000 Ea	2.50000	120.00	5.00000	240.00	5.08000	243.84
0510 8157050 _ Anemone canadensis, #1 cont.	51.000 Ea	20.00000	1,020.00	15.00000	765.00	15.23000	776.73

Tabulation of Bids

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Section ID/Descr: 1 - Road Work							
0515 8157050 _ Baptista australis, #1 cont.	21.000 Ea	20.00000	420.00	20.00000	420.00	20.30000	426.30
0520 8157050 _ Carex pensylvanica, #1 cont.	143.000 Ea	20.00000	2,860.00	15.00000	2,145.00	15.23000	2,177.89
0525 8157050 _ Gleditsia triacanthos inermis 'Skyline', 2.5 inch	24.000 Ea	800.00000	19,200.00	660.00000	15,840.00	670.05000	16,081.20
0530 8157050 _ Hemerocallis 'Stella D'oro', #1 cont.	429.000 Ea	20.00000	8,580.00	15.00000	6,435.00	15.23000	6,533.67
0535 8157050 _ Iris versicolor, #1 cont.	228.000 Ea	20.00000	4,560.00	15.00000	3,420.00	15.23000	3,472.44
0540 8157050 _ Ligularia 'Bottle Rocket', #1 cont.	43.000 Ea	20.00000	860.00	25.00000	1,075.00	25.38000	1,091.34
0545 8157050 _ Liriope muscari 'Variegata', #1 cont.	1,465.000 Ea	20.00000	29,300.00	14.00000	20,510.00	14.21000	20,817.65

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Section ID/Descr: 1 - Road Work							
0550 8157050	425.000	20.00000	8,500.00	15.00000	6,375.00	15.23000	6,472.75
_ Nepeta racemosa 'Walkers Low', #1 cont.	Ea						
0555 8157050	47.000	20.00000	940.00	20.00000	940.00	20.30000	954.10
_ Persicaria amplexicaulis 'Rosea', #1 cont.	Ea						
0560 8157050	103.000	45.00000	4,635.00	23.00000	2,369.00	23.35000	2,405.05
_ Rosa 'Drift Pink', #2 cont.	Ea						
0565 8157050	73.000	20.00000	1,460.00	22.00000	1,606.00	22.34000	1,630.82
_ Rudbeckia fulgida 'Little Goldstar', #1 cont.	Ea						
0570 8157050	181.000	20.00000	3,620.00	22.00000	3,982.00	22.34000	4,043.54
_ Salvia nemerosa 'Pink Profusion', #1 cont.	Ea						
0575 8157050	297.000	20.00000	5,940.00	18.00000	5,346.00	18.27000	5,426.19
_ Sedum 'Red Cauli', #1 cont.	Ea						
0580 8160055	955.000	6.00000	5,730.00	7.00000	6,685.00	7.11000	6,790.05
Sodding	Syd						

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Section ID/Descr: 1 - Road Work							
0585 8160061 Topsoil Surface, Furn, 3 inch	955.000 Syd	2.50000	2,387.50	4.00000	3,820.00	4.06000	3,877.30
0590 8160090 Water, Sodding/Seeding	57.000 Unit	35.00000	1,995.00	1.00000	57.00	1.02000	58.14
0595 8167001 _ Landscape Edging, Steel	375.000 Ft	15.00000	5,625.00	20.00000	7,500.00	20.30000	7,612.50
0600 8167011 _ Hardwood Mulch, Furn, 4 inch	1,455.000 Syd	5.00000	7,275.00	11.00000	16,005.00	11.17000	16,252.35
0605 8167021 _ Prepared Soil	725.000 Cyd	60.00000	43,500.00	48.00000	34,800.00	48.73000	35,329.25
0610 8200458 TS Face, Bag	8.000 Ea	170.00000	1,360.00	800.00000	6,400.00	740.00000	5,920.00
0615 8200459 TS Face, Bag, Rem	8.000 Ea	110.00000	880.00	700.00000	5,600.00	740.00000	5,920.00

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Section ID/Descr: 1 - Road Work							
0620 8230096 Hydrant, Relocate, Case 2	1.000 Ea	3,000.00000	3,000.00	20,000.00000	20,000.00	13,220.00000	13,220.00
0625 8230151 Water Main, DI, 6 inch, Tr Det G	12.000 Ft	150.00000	1,800.00	300.00000	3,600.00	314.00000	3,768.00
0630 8237001 _ Water Main, Copper, Type K, 1/2 inch	9.000 Ft	85.00000	765.00	350.00000	3,150.00	170.00000	1,530.00
0635 8237050 _ Gate Box, Adj, Case 1	4.000 Ea	550.00000	2,200.00	1,000.00000	4,000.00	3,200.00000	12,800.00
0640 8237050 _ Gate Well Cover, Adj, Case 1	11.000 Ea	550.00000	6,050.00	2,200.00000	24,200.00	3,150.00000	34,650.00
0645 8237050 _ Gate Well Cover, Adj, Case 2	4.000 Ea	400.00000	1,600.00	2,000.00000	8,000.00	985.00000	3,940.00
0650 8237050 _ Live Tap, 12 inch by 1/2 inch	1.000 Ea	500.00000	500.00	3,000.00000	3,000.00	7,500.00000	7,500.00

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Section ID/Descr: 1 - Road Work							
0655 8507050 _ Bench	4.000 Ea	2,500.00000	10,000.00	2,500.00000	10,000.00	2,100.00000	8,400.00
0660 8507050 _ Bike Fix-It Station	1.000 Ea	3,500.00000	3,500.00	1,450.00000	1,450.00	2,130.00000	2,130.00
0665 8507050 _ Bike Rack	6.000 Ea	500.00000	3,000.00	1,000.00000	6,000.00	800.00000	4,800.00
0670 8507050 _ Bottle Filling Station	1.000 Ea	9,000.00000	9,000.00	13,000.00000	13,000.00	10,150.00000	10,150.00
0675 8507050 _ Leaning Rail, 4 Foot	1.000 Ea	1,000.00000	1,000.00	1,200.00000	1,200.00	1,150.00000	1,150.00
0680 8507050 _ Leaning Rail, 6 Foot	3.000 Ea	1,200.00000	3,600.00	1,250.00000	3,750.00	1,350.00000	4,050.00
0685 8507050 _ Trash Receptacle	4.000 Ea	2,500.00000	10,000.00	2,000.00000	8,000.00	2,400.00000	9,600.00

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Section Totals:			$1,516,540.10		$2,739,085.72		$3,081,388.79
Contract Item Totals:			**$1,516,540.10**		**$2,739,085.72**		**$3,081,388.79**
Contract Grand Totals:			**$1,516,540.10**		**$2,739,085.72**		**$3,081,388.79**

( ) indicates item is bid as Lump Sum

Low Bid Item Analysis

Call Number: 018
Contract ID: 63051-210934
Project(s): 22A0483
Letting Date: June 03, 2022 10:30 AM
Region(s): Oakland TSC
Counties: Oakland County
Contract Time: 09/19/24 COMPLETION DATE
Contract Description: Concrete shared use path, curb, gutter, sidewalk and ramps, storm drain and pavement markings.
Vendor ID/Name: 06366 - DiPonio Contracting, Inc.

List of Items

Line	Item ID/ Item Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est Pct	Overrun (+) Underrun (-)
Section ID/Descr: 1 - Road Work								
0005	1027051	(1)	3,000.00000	7,000.00000	3,000.00	7,000.00	233.33%	4,000.00
	_ Audio-Visual Record of Construction Area			LSUM				
0010	1100001	(1)	135,500.00000	135,500.00000	135,500.00	135,500.00	100.00%	0.00
	Mobilization, Max $135,500.00			LSUM				
0015	2020004	16.000	250.00000	675.00000	4,000.00	10,800.00	270.00%	6,800.00
	Tree, Rem, 6 inch to 18 inch			Ea				
0020	2030011	9.000	500.00000	600.00000	4,500.00	5,400.00	120.00%	900.00
	Dr Structure, Rem			Ea				
0025	2030015	116.000	20.00000	50.00000	2,320.00	5,800.00	250.00%	3,480.00
	Sewer, Rem, Less than 24 inch			Ft				

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Section ID/Descr: 1 - Road Work								
0030	2040020 Curb and Gutter, Rem	1,555.000	5.00000	20.00000 Ft	7,775.00	31,100.00	400.00%	23,325.00
0035	2040050 Pavt, Rem	3,262.000	8.00000	35.00000 Syd	26,096.00	114,170.00	437.50%	88,074.00
0040	2040055 Sidewalk, Rem	2,214.000	5.00000	30.00000 Syd	11,070.00	66,420.00	600.00%	55,350.00
0045	2050016 Excavation, Earth	2,245.000	7.50000	46.00000 Cyd	16,837.50	103,270.00	613.33%	86,432.50
0050	2050023 Granular Material, Cl II	100.000	20.00000	50.00000 Cyd	2,000.00	5,000.00	250.00%	3,000.00

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Section ID/Descr: 1 - Road Work								
0055	2057002	54.000	3,000.00000	2,400.00000	162,000.00	129,600.00	80.00%	-32,400.00
	_ Station Grading			Sta				
0060	2057021	1,175.000	60.00000	115.00000	70,500.00	135,125.00	191.67%	64,625.00
	_ Aggregate, 6A			Cyd				
0065	2057021	1,085.000	15.00000	75.00000	16,275.00	81,375.00	500.00%	65,100.00
	_ Granular Material, Cl II, Special			Cyd				
0070	2080020	41.000	110.00000	150.00000	4,510.00	6,150.00	136.36%	1,640.00
	Erosion Control, Inlet Protection, Fabric Drop			Ea				
0075	2090001	(1)	10,000.00000	30,000.00000	10,000.00	30,000.00	300.00%	20,000.00
	Project Cleanup			LSUM				

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Section ID/Descr: 1 - Road Work								
0080	3062000	2.000	700.00000	1,000.00000	1,400.00	2,000.00	142.86%	600.00
	Driveway Maintenance, Commercial			Ea				
0085	3062002	4.000	700.00000	1,500.00000	2,800.00	6,000.00	214.29%	3,200.00
	Intersection Maintenance			Ea				
0090	4020030	6.000	50.00000	250.00000	300.00	1,500.00	500.00%	1,200.00
	Sewer, Cl A, 6 inch, Tr Det B			Ft				
0095	4020031	8.000	65.00000	300.00000	520.00	2,400.00	461.54%	1,880.00
	Sewer, Cl A, 8 inch, Tr Det B			Ft				
0100	4020600	183.000	80.00000	200.00000	14,640.00	36,600.00	250.00%	21,960.00
	Sewer, Cl E, 12 inch, Tr Det B			Ft				

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Section ID/Descr: 1 - Road Work								
0101	4021204	1.000	500.00000	1,000.00000	500.00	1,000.00	200.00%	500.00
	Sewer Tap, 12 inch			Ea				
0105	4027001	822.000	50.00000	50.00000	41,100.00	41,100.00	100.00%	0.00
	_ Sewer, Cl A, Perforated, 6 inch, Tr Det B			Ft				
0110	4027001	572.000	65.00000	70.00000	37,180.00	40,040.00	107.69%	2,860.00
	_ Sewer, Cl A, Perforated, 8 inch, Tr Det B			Ft				
0115	4027001	119.000	30.00000	80.00000	3,570.00	9,520.00	266.67%	5,950.00
	_ Sewer, PVC, Sch. 40, 4 inch			Ft				
0120	4030005	2.000	550.00000	2,200.00000	1,100.00	4,400.00	400.00%	3,300.00
	Dr Structure Cover, Adj, Case 1			Ea				

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Section ID/Descr: 1 - Road Work								
0125	4030006 Dr Structure Cover, Adj, Case 2	3.000	550.00000	1,000.00000 Ea	1,650.00	3,000.00	181.82%	1,350.00
0130	4030200 Dr Structure, 24 inch dia	11.000	1,300.00000	3,500.00000 Ea	14,300.00	38,500.00	269.23%	24,200.00
0135	4030210 Dr Structure, 48 inch dia	10.000	2,400.00000	5,000.00000 Ea	24,000.00	50,000.00	208.33%	26,000.00
0140	4030220 Dr Structure, 60 inch dia	1.000	4,000.00000	9,000.00000 Ea	4,000.00	9,000.00	225.00%	5,000.00
0145	4030280 Dr Structure, Adj, Add Depth	1.000	200.00000	1,000.00000 Ft	200.00	1,000.00	500.00%	800.00

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List of Items

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Section ID/Descr: 1 - Road Work								
0150	4030308 Dr Structure, Tap, 8 inch	1.000	400.00000	800.00000 Ea	400.00	800.00	200.00%	400.00
0151	4030312 Dr Structure, Tap, 12 inch	2.000	500.00000	1,250.00000 Ea	1,000.00	2,500.00	250.00%	1,500.00
0155	4037050 _ Dr Structure Cover, Storm	22.000	600.00000	800.00000 Ea	13,200.00	17,600.00	133.33%	4,400.00
0160	5010005 HMA Surface, Rem	2,242.000	5.00000	45.00000 Syd	11,210.00	100,890.00	900.00%	89,680.00
0165	6020106 Conc Pavt, Nonreinf, 9 inch	258.000	55.00000	95.00000 Syd	14,190.00	24,510.00	172.73%	10,320.00

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Section ID/Descr: 1 - Road Work								
0170	6020201 Joint, Contraction, C3p	147.000	9.00000	5.00000 Ft	1,323.00	735.00	55.56%	-588.00
0175	6030020 Joint, Contraction, Crg	90.000	12.00000	25.00000 Ft	1,080.00	2,250.00	208.33%	1,170.00
0180	6030021 Joint, Expansion, Erg	108.000	12.00000	25.00000 Ft	1,296.00	2,700.00	208.33%	1,404.00
0185	6030030 Lane Tie, Epoxy Anchored	76.000	9.50000	10.00000 Ea	722.00	760.00	105.26%	38.00
0190	6030050 Pavt Repr, Nonreinf Conc, 11 inch	98.000	75.00000	125.00000 Syd	7,350.00	12,250.00	166.67%	4,900.00

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Line	Item ID/ Item Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est Pct	Overrun (+) Underrun (-)
Section ID/Descr: 1 - Road Work								
0195	8007001	59.000	50.00000	80.00000	2,950.00	4,720.00	160.00%	1,770.00
	_ Curb Inlet			Ft				
0200	8007050	4.000	500.00000	700.00000	2,000.00	2,800.00	140.00%	800.00
	_ Bench, Rem			Ea				
0205	8007050	1.000	500.00000	700.00000	500.00	700.00	140.00%	200.00
	_ Bike Rack, Rem			Ea				
0210	8010006	217.000	45.00000	70.00000	9,765.00	15,190.00	155.56%	5,425.00
	Driveway, Nonreinf Conc, 7 inch			Syd				
0215	8020035	493.000	21.00000	30.00000	10,353.00	14,790.00	142.86%	4,437.00
	Curb and Gutter, Conc, Det F1			Ft				

Low Bid Item Analysis

Call Number: 018
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Letting Date: June 03, 2022 10:30 AM
Region(s): Oakland TSC
Counties: Oakland County
Contract Time: 09/19/24 COMPLETION DATE
Contract Description: Concrete shared use path, curb, gutter, sidewalk and ramps, storm drain and pavement markings.
Vendor ID/Name: 06366 - DiPonio Contracting, Inc.

List of Items

Line	Item ID/ Item Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est Pct	Overrun (+) Underrun (-)
Section ID/Descr: 1 - Road Work								
0220	8020039	1,499.000	21.00000	35.00000	31,479.00	52,465.00	166.67%	20,986.00
	Curb and Gutter, Conc, Det F5			Ft				
0225	8020050	147.000	21.00000	50.00000	3,087.00	7,350.00	238.10%	4,263.00
	Driveway Opening, Conc, Det M			Ft				
0230	8030010	152.000	40.00000	65.00000	6,080.00	9,880.00	162.50%	3,800.00
	Detectable Warning Surface			Ft				
0235	8030030	275.000	24.00000	35.00000	6,600.00	9,625.00	145.83%	3,025.00
	Curb Ramp Opening, Conc			Ft				
0240	8030044	15,665.000	4.50000	5.80000	70,492.50	90,857.00	128.89%	20,364.50
	Sidewalk, Conc, 4 inch			Sft				

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Section ID/Descr: 1 - Road Work								
0245	8030051	15,050.000	1.00000	6.15000	15,050.00	92,557.50	615.00%	77,507.50
	Sidewalk, Clay Brick Pavers, Rem			Sft				
0250	8030100	4.000	800.00000	2,885.00000	3,200.00	11,540.00	360.63%	8,340.00
	Steps, Conc			Cyd				
0255	8032001	846.000	6.00000	9.50000	5,076.00	8,037.00	158.33%	2,961.00
	Curb Ramp, Conc, 4 inch			Sft				
0260	8037010	2,119.000	8.00000	12.00000	16,952.00	25,428.00	150.00%	8,476.00
	_ Curb Ramp, Conc, 8 inch			Sft				
0265	8037010	495.000	8.00000	14.00000	3,960.00	6,930.00	175.00%	2,970.00
	_ Curb Ramp, Conc, Decorative Colored, 4 inch			Sft				

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Section ID/Descr: 1 - Road Work								
0270	8037010	619.000	10.00000	16.00000	6,190.00	9,904.00	160.00%	3,714.00
	_ Curb Ramp, Conc, Decorative Colored, 8 inch			Sft				
0275	8037010	7,132.000	10.00000	30.00000	71,320.00	213,960.00	300.00%	142,640.00
	_ Permeable Pavers			Sft				
0280	8037010	11,070.000	7.50000	9.50000	83,025.00	105,165.00	126.67%	22,140.00
	_ Sidewalk, Conc, Decorative Colored, 4 inch			Sft				
0281	8100010	4.000	50.00000	200.00000	200.00	800.00	400.00%	600.00
	Band, Sign			Ea				
0285	8100090	1.000	2,000.00000	2,000.00000	2,000.00	2,000.00	100.00%	0.00
	Cantilever, Rem			Ea				

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Section ID/Descr: 1 - Road Work								
0290	8100104	1.000	28,000.00000	40,000.00000	28,000.00	40,000.00	142.86%	12,000.00
	Cantilever, Type E			Ea				
0295	8100170	26.000	1,200.00000	1,606.00000	31,200.00	41,756.00	133.83%	10,556.00
	Fdn, Cantilever Sign Structure Type E, 48 inch Dia, Cased			Ft				
0300	8100190	1.000	5,000.00000	2,500.00000	5,000.00	2,500.00	50.00%	-2,500.00
	Fdn, Cantilever, Rem			Ea				
0305	8100371	271.000	7.00000	8.00000	1,897.00	2,168.00	114.29%	271.00
	Post, Steel, 3 lb			Ft				
0310	8100380	56.000	25.00000	20.00000	1,400.00	1,120.00	80.00%	-280.00
	Post, Wood, 4 inch by 6 inch			Ft				

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Section ID/Descr: 1 - Road Work								
0315	8100390 Sign, Type I, Erect, Salv	1.000	150.00000	550.00000 Ea	150.00	550.00	366.67%	400.00
0320	8100402 Sign, Type III, Erect, Salv	2.000	50.00000	100.00000 Ea	100.00	200.00	200.00%	100.00
0325	8100403 Sign, Type III, Rem	23.000	12.00000	10.00000 Ea	276.00	230.00	83.33%	-46.00
0330	8100404 Sign, Type IIIA	33.000	20.00000	21.00000 Sft	660.00	693.00	105.00%	33.00
0335	8100405 Sign, Type IIIB	246.000	20.00000	21.00000 Sft	4,920.00	5,166.00	105.00%	246.00

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Section ID/Descr: 1 - Road Work								
0340	8102003	3.000	100.00000	150.00000	300.00	450.00	150.00%	150.00
	Sign, Type III, Rem, Salv			Ea				
0345	8110092	1,659.000	2.00000	2.95000	3,318.00	4,894.05	147.50%	1,576.05
	Pavt Mrkg, Polyurea, 4 inch, Yellow			Ft				
0350	8110105	28.000	60.00000	110.00000	1,680.00	3,080.00	183.33%	1,400.00
	Pavt Mrkg, Polyurea, Bike, Small Sym			Ea				
0355	8110110	260.000	2.00000	5.75000	520.00	1,495.00	287.50%	975.00
	Pavt Mrkg, Polyurea, 12 inch, Crosswalk			Ft				
0360	8110114	50.000	5.00000	15.00000	250.00	750.00	300.00%	500.00
	Pavt Mrkg, Polyurea, 24 inch, Stop Bar			Ft				

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List of Items

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Section ID/Descr: 1 - Road Work								
0365	8110195	493.000	2.00000	1.95000	986.00	961.35	97.50%	-24.65
	Pavt Mrkg, Thermopl, 4 inch, White			Ft				
0370	8110417	1.000	60.00000	200.00000	60.00	200.00	333.33%	140.00
	Pavt Mrkg, Polyurea, Thru and Rt Turn Arrow Sym			Ea				
0375	8110418	2.000	60.00000	150.00000	120.00	300.00	250.00%	180.00
	Pavt Mrkg, Polyurea, Thru Arrow Sym			Ea				
0380	8110420	170.000	2.00000	2.95000	340.00	501.50	147.50%	161.50
	Pavt Mrkg, Polyurea, For On-Street Parking, 4 inch, White			Ft				
0385	8112170	28.000	60.00000	110.00000	1,680.00	3,080.00	183.33%	1,400.00
	Pavt Mrkg, Polyurea, Bike Thru Arrow Sym			Ea				

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Section ID/Descr: 1 - Road Work								
0390	8120012	37.000	80.00000	135.00000	2,960.00	4,995.00	168.75%	2,035.00
	Barricade, Type III, High Intensity, Double Sided, Lighted, Furn			Ea				
0395	8120013	37.000	5.00000	0.01000	185.00	0.37	0.20%	-184.63
	Barricade, Type III, High Intensity, Double Sided, Lighted, Oper			Ea				
0400	8120026	4.000	150.00000	225.00000	600.00	900.00	150.00%	300.00
	Pedestrian Type II Barricade, Temp			Ea				
0405	8120027	100.000	20.00000	45.00000	2,000.00	4,500.00	225.00%	2,500.00
	Pedestrian Type II Channelizer, Temp			Ft				
0410	8120140	5.000	500.00000	1,000.00000	2,500.00	5,000.00	200.00%	2,500.00
	Lighted Arrow, Type C, Furn			Ea				

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Section ID/Descr: 1 - Road Work								
0415	8120141	5.000	75.00000	0.01000	375.00	0.05	0.01%	-374.95
	Lighted Arrow, Type C, Oper			Ea				
0420	8120210	836.000	0.60000	0.95000	501.60	794.20	158.33%	292.60
	Pavt Mrkg, Longit, 6 inch or Less Width, Rem			Ft				
0425	8120245	5,350.000	2.50000	2.35000	13,375.00	12,572.50	94.00%	-802.50
	Pavt Mrkg, Wet Reflective, Type R, Tape, 4 inch, White, Temp			Ft				
0430	8120252	670.000	25.00000	45.00000	16,750.00	30,150.00	180.00%	13,400.00
	Plastic Drum, Fluorescent, Furn			Ea				
0435	8120253	670.000	1.00000	0.01000	670.00	6.70	1.00%	-663.30
	Plastic Drum, Fluorescent, Oper			Ea				

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0440	8120350	450.000	25.00000	9.00000	11,250.00	4,050.00	36.00%	-7,200.00
	Sign, Type B, Temp, Prismatic, Furn			Sft				
0445	8120351	450.000	20.00000	0.01000	9,000.00	4.50	0.05%	-8,995.50
	Sign, Type B, Temp, Prismatic, Oper			Sft				
0450	8120370	(1)	7,500.00000	200,000.00000	7,500.00	200,000.00	2666.67%	192,500.00
	Traf Regulator Control			LSUM				
0455	8150001	(1)	45,600.00000	45,600.00000	45,600.00	45,600.00	100.00%	0.00
	Site Preparation, Max $45,600.00			LSUM				
0460	8150002	(1)	22,150.00000	35,000.00000	22,150.00	35,000.00	158.01%	12,850.00
	Watering and Cultivating, First Season, Min $22,150.00			LSUM				

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Section ID/Descr: 1 - Road Work								
0465	8150003	(1)	27,500.00000	39,000.00000	27,500.00	39,000.00	141.82%	11,500.00
	Watering and Cultivating, 2nd Season, Min $27,500.00			LSUM				
0470	8151064	29.000	75.00000	50.00000	2,175.00	1,450.00	66.67%	-725.00
	Cornus sericea, #5 cont.			Ea				
0475	8151274	501.000	20.00000	16.00000	10,020.00	8,016.00	80.00%	-2,004.00
	Echinacea purpurpea 'Kim's Knee High', #1 cont.			Ea				
0480	8151635	3.000	1,000.00000	650.00000	3,000.00	1,950.00	65.00%	-1,050.00
	Ginko biloba 'Fastigiata', 2 inch			Ea				
0485	8152104	33.000	20.00000	16.00000	660.00	528.00	80.00%	-132.00
	Liatris spicata 'Kobold', #1 cont.			Ea				

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0490	8152513	5.000	1,000.00000	650.00000	5,000.00	3,250.00	65.00%	-1,750.00
	Nyssa sylvatica, 2 inch			Ea				
0495	8152725	117.000	55.00000	55.00000	6,435.00	6,435.00	100.00%	0.00
	Physocarpus opulifolius, #3 cont.			Ea				
0500	8157050	1.000	1,000.00000	640.00000	1,000.00	640.00	64.00%	-360.00
	_ Acer rubrum, 2.5 inch			Ea				
0505	8157050	48.000	2.50000	5.00000	120.00	240.00	200.00%	120.00
	_ Allium 'Purple Rain', 10 cm Bulb			Ea				
0510	8157050	51.000	20.00000	15.00000	1,020.00	765.00	75.00%	-255.00
	_ Anemone canadensis, #1 cont.			Ea				

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0515	8157050	21.000	20.00000	20.00000	420.00	420.00	100.00%	0.00
	_ Baptista australis, #1 cont.			Ea				
0520	8157050	143.000	20.00000	15.00000	2,860.00	2,145.00	75.00%	-715.00
	_ Carex pensylvanica, #1 cont.			Ea				
0525	8157050	24.000	800.00000	660.00000	19,200.00	15,840.00	82.50%	-3,360.00
	_ Gleditsia triacanthos inermis 'Skyline', 2.5 inch			Ea				
0530	8157050	429.000	20.00000	15.00000	8,580.00	6,435.00	75.00%	-2,145.00
	_ Hemerocallis 'Stella D'oro', #1 cont.			Ea				
0535	8157050	228.000	20.00000	15.00000	4,560.00	3,420.00	75.00%	-1,140.00
	_ Iris versicolor, #1 cont.			Ea				

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0540	8157050	43.000	20.00000	25.00000	860.00	1,075.00	125.00%	215.00
	_ Ligularia 'Bottle Rocket', #1 cont.			Ea				
0545	8157050	1,465.000	20.00000	14.00000	29,300.00	20,510.00	70.00%	-8,790.00
	_ Liriope muscari 'Variegata', #1 cont.			Ea				
0550	8157050	425.000	20.00000	15.00000	8,500.00	6,375.00	75.00%	-2,125.00
	_ Nepeta racemosa 'Walkers Low', #1 cont.			Ea				
0555	8157050	47.000	20.00000	20.00000	940.00	940.00	100.00%	0.00
	_ Persicaria amplexicaulis 'Rosea', #1 cont.			Ea				
0560	8157050	103.000	45.00000	23.00000	4,635.00	2,369.00	51.11%	-2,266.00
	_ Rosa 'Drift Pink', #2 cont.			Ea				

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Section ID/Descr: 1 - Road Work								
0565	8157050	73.000	20.00000	22.00000	1,460.00	1,606.00	110.00%	146.00
	_ Rudbeckia fulgida 'Little Goldstar', #1 cont.			Ea				
0570	8157050	181.000	20.00000	22.00000	3,620.00	3,982.00	110.00%	362.00
	_ Salvia nemerosa 'Pink Profusion', #1 cont.			Ea				
0575	8157050	297.000	20.00000	18.00000	5,940.00	5,346.00	90.00%	-594.00
	_ Sedum 'Red Cauli', #1 cont.			Ea				
0580	8160055	955.000	6.00000	7.00000	5,730.00	6,685.00	116.67%	955.00
	Sodding			Syd				
0585	8160061	955.000	2.50000	4.00000	2,387.50	3,820.00	160.00%	1,432.50
	Topsoil Surface, Furn, 3 inch			Syd				

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0590	8160090 Water, Sodding/Seeding	57.000	35.00000	1.00000 Unit	1,995.00	57.00	2.86%	-1,938.00
0595	8167001 _ Landscape Edging, Steel	375.000	15.00000	20.00000 Ft	5,625.00	7,500.00	133.33%	1,875.00
0600	8167011 _ Hardwood Mulch, Furn, 4 inch	1,455.000	5.00000	11.00000 Syd	7,275.00	16,005.00	220.00%	8,730.00
0605	8167021 _ Prepared Soil	725.000	60.00000	48.00000 Cyd	43,500.00	34,800.00	80.00%	-8,700.00
0610	8200458 TS Face, Bag	8.000	170.00000	800.00000 Ea	1,360.00	6,400.00	470.59%	5,040.00

Low Bid Item Analysis

Call Number: 018
Contract ID: 63051-210934
Project(s): 22A0483
Letting Date: June 03, 2022 10:30 AM
Region(s): Oakland TSC
Counties: Oakland County
Contract Time: 09/19/24 COMPLETION DATE
Contract Description: Concrete shared use path, curb, gutter, sidewalk and ramps, storm drain and pavement markings.
Vendor ID/Name: 06366 - DiPonio Contracting, Inc.

List of Items

Line	Item ID/ Item Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est Pct	Overrun (+) Underrun (-)
Section ID/Descr: 1 - Road Work								
0615	8200459 TS Face, Bag, Rem	8.000	110.00000	700.00000 Ea	880.00	5,600.00	636.36%	4,720.00
0620	8230096 Hydrant, Relocate, Case 2	1.000	3,000.00000	20,000.00000 Ea	3,000.00	20,000.00	666.67%	17,000.00
0625	8230151 Water Main, DI, 6 inch, Tr Det G	12.000	150.00000	300.00000 Ft	1,800.00	3,600.00	200.00%	1,800.00
0630	8237001 _ Water Main, Copper, Type K, 1/2 inch	9.000	85.00000	350.00000 Ft	765.00	3,150.00	411.76%	2,385.00
0635	8237050 _ Gate Box, Adj, Case 1	4.000	550.00000	1,000.00000 Ea	2,200.00	4,000.00	181.82%	1,800.00

Low Bid Item Analysis

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List of Items

Line	Item ID/ Item Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est Pct	Overrun (+) Underrun (-)
Section ID/Descr: 1 - Road Work								
0640	8237050	11.000	550.00000	2,200.00000	6,050.00	24,200.00	400.00%	18,150.00
	_ Gate Well Cover, Adj, Case 1			Ea				
0645	8237050	4.000	400.00000	2,000.00000	1,600.00	8,000.00	500.00%	6,400.00
	_ Gate Well Cover, Adj, Case 2			Ea				
0650	8237050	1.000	500.00000	3,000.00000	500.00	3,000.00	600.00%	2,500.00
	_ Live Tap, 12 inch by 1/2 inch			Ea				
0655	8507050	4.000	2,500.00000	2,500.00000	10,000.00	10,000.00	100.00%	0.00
	_ Bench			Ea				
0660	8507050	1.000	3,500.00000	1,450.00000	3,500.00	1,450.00	41.43%	-2,050.00
	_ Bike Fix-It Station			Ea				

Low Bid Item Analysis

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Contract ID: 63051-210934
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List of Items

Line	Item ID/ Item Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est Pct	Overrun (+) Underrun (-)
Section ID/Descr: 1 - Road Work								
0665	8507050 _ Bike Rack	6.000	500.00000	1,000.00000 Ea	3,000.00	6,000.00	200.00%	3,000.00
0670	8507050 _ Bottle Filling Station	1.000	9,000.00000	13,000.00000 Ea	9,000.00	13,000.00	144.44%	4,000.00
0675	8507050 _ Leaning Rail, 4 Foot	1.000	1,000.00000	1,200.00000 Ea	1,000.00	1,200.00	120.00%	200.00
0680	8507050 _ Leaning Rail, 6 Foot	3.000	1,200.00000	1,250.00000 Ea	3,600.00	3,750.00	104.17%	150.00
0685	8507050 _ Trash Receptacle	4.000	2,500.00000	2,000.00000 Ea	10,000.00	8,000.00	80.00%	-2,000.00

Low Bid Item Analysis

Call Number: 018
Contract ID: 63051-210934
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List of Items

Line	Item ID/ Item Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est Pct	Overrun (+) Underrun (-)
			Section Totals:	**$1,516,540.10**	**$2,739,085.72**		**180.61%**	**$1,222,545.62**
			Contract Total for Calculated Low Bidders Bid Items:	**$1,516,540.10**	**$2,739,085.72**		**180.61%**	**$1,222,545.62**

( ) indicates item is bid as Lump Sum

City of Pleasant Ridge

Amy M. Allison, Assistant City Manager/City Clerk

From: Amy M. Allison, Assistant City Manager/City Clerk

To: Mayor and City Commission

Date: June 14, 2022

Re: Property Assessing Agreement Renewal

Overview

The City of Pleasant Ridge contracts Property Assessing Services with Oakland County Equalization.

The current agreement assessing services will expire on June 30th. The proposed contract for your consideration this evening will be effective July 1, 2022 through June 30, 2023. The shortened duration of the contract allows for Oakland County Equalization to hire a new County Equalization Director, and allow for that individual to meet with contract municipalities to provide feedback regarding the level and quality of services provided. The contract language is the same as previous years, and there is an inflationary increase this year. The cost per parcel has been increased by 4%. The County is anticipating the next renewal will be for the usual three year term.

Rates	2019-2020	2020.2021	2021-2022	Proposed
Real Property (1,260 pacels)	$14.14	$14.28	$14.42	$15.00
Personal Property (87 parcels)	$12.93	$13.06	$13.19	$13.72

The City of Pleasant Ridge enjoys the relationship with Oakland County Equalization. The City has seen long term assessors contracted to provide services, who are familiar with our community, the housing stock and the values of properties. The current certified assessor has been assigned to the City for the past 11 years, and is very responsive to questions or concerns, not only from City staff but also residents.

Services provided under the contract include annual assessing of real and personal property, property appraisal inspections, board of review meeting document preparation and training, and representation at the Michigan Tax Tribunal and State Tax Commission.

Requested Action

That the contract with Oakland County for assessing services be approved.

OAKLAND COUNTY MICHIGAN
MANAGEMENT & BUDGET

OAKLAND COUNTY EXECUTIVE DAVID COULTER

Equalization Division
[redacted]

May 18, 2022

Amy M. Allison, City Clerk
City of Pleasant Ridge
23925 Woodward Ave.
Pleasant Ridge, MI 48069

RE: Renewal of Contract for Assessing Services with the City of Pleasant Ridge

Dear Amy M. Allison:

The existing assessing contract between Oakland County Equalization and the City of Pleasant Ridge will expire on June 30, 2022. In anticipation of a renewal of the contract, we have prepared four copies for your review and consideration by your City Officials.

In preparing the renewal document, our office has reproduced the provisions of the existing contract except for the following provision: the cost per parcel has been adjusted by a 4% increase; as referenced in the letter dated April 14, 2022, from Deputy County Executive Sean Carlson. In summary, the cost per parcel to the city will be as follows:

Contract Year	Real Property Rate	Personal Property Rate
2022-2023	$15.00	$13.72

These rates will be effective for the period July 1, 2022, to June 30, 2023. When the attached renewal contract is approved by your Governing Body and the authorized officials have affixed their signatures, kindly return four (4) copies to Oakland County Equalization Division.

Should you have any questions or concerns, please do not hesitate to reach out. You can contact Kimberly Hampton at [redacted]

Sincerely,

Kyle I. Jen
Director of Management and Budget
Oakland County

KIJ/kdh
Enclosures

[redacted]

OAKLAND COUNTY
COUNTY MICHIGAN

OAKLAND COUNTY EXECUTIVE DAVID COULTER

Sean Carlson, Deputy County Executive
[redacted]

April 14, 2022

Dear City Manager or Township Supervisor,

I am writing to update you on two matters related to the Oakland County Equalization Division.

First, we are near completion of the hiring process for a new County Equalization Director to lead the division and expect to be able to announce the result of that process within the next month. In the meantime, Management and Budget Director Kyle Jen continues to oversee the ongoing operations of the division. We trust your municipality received quality service through this most recent assessment and Board of Review cycle.

Second, our three-year contracts with each of your municipalities for ongoing assessing and related services are set to expire at the end of June. We are proposing to renew each of your contracts for one year with a 4% inflationary increase in rates. This will provide time for the new Equalization Director to come on board, get feedback from each of you on the current quality and level of service you receive, and evaluate any changes to improve those services going forward. We will come back next year with proposed three-year contracts, reflecting any changes in rates to more uniformly account for both current and additional services that may be offered.

Your primary contact from the Equalization Division will be in touch shortly to get the contract renewal process started, but please don't hesitate to reach out to either Kyle [redacted] or me with any questions or concerns you may have about the services you're receiving or the one-year contract renewal.

Thank you for your patience as we work to further enhance the services you receive from the Oakland County Equalization Division.

Sincerely,

Sean Carlson
Deputy County Executive

c: Primary assessing contacts
Ann Grady, Equalization Chief
Tracy Jones, Equalization Chief
Terry Schultz, Equalization Chief

[redacted]

CONTRACT FOR OAKLAND COUNTY

EQUALIZATION DIVISION ASSISTANCE SERVICES

WITH THE CITY OF PLEASANT RIDGE
(Real and Personal Property Services)

This CONTRACT FOR OAKLAND COUNTY EQUALIZATION DIVISION ASSISTANCE SERVICES WITH THE CITY OF PLEASANT RIDGE (hereafter, this "Contract") is made and entered into between the COUNTY OF OAKLAND, a Michigan Constitutional and Municipal Corporation, whose address is 1200 North Telegraph Road, Pontiac, Michigan 48341 (hereafter, the "County"), and the CITY OF PLEASANT RIDGE, a Michigan Constitutional and Municipal Corporation whose address is 23925 Woodward Avenue, Pleasant Ridge, Michigan 48069 (hereafter, the "Municipality"). In this Contract, either the County and/or the Municipality may also be referred to individually as a "Party" or jointly as "Parties."

INTRODUCTORY STATEMENTS

A. The Municipality, pursuant to State law, including, but not limited to, the Michigan General Property Tax Act (MCL 211.1, et seq.) is required to perform real and personal property tax appraisals and assessments for all nonexempt real and personal property located within the geographic boundaries of the Municipality for the purpose of levying State and local property taxes.

B. The Parties recognize and agree that absent an agreement such as this, or pursuant to an order of the State Tax Commission mandating the County to perform all or some of the property tax appraisal and tax assessment responsibilities for real and/or personal property located within the Municipality's geographic boundaries (MCL 211.10(f)), the County, has no obligation to provide these Services to or for the Municipality.

C. The Michigan General Property Tax Act (MCL 211.34(3) provides that the County Board of Commissioners, through the Equalization Division, may furnish assistance to local assessing officers in the performance of certain legally mandated property appraisal and assessment responsibilities.

D. The Municipality has requested the County's Equalization Division assistance in performing the "Equalization Division Assistance Services" (as described and defined in this Contract) and has agreed in return to reimburse the County as provided for in this Contract.

E. The County has determined that it has sufficient "Equalization Division Personnel," as defined herein, possessing the requisite knowledge and expertise and is agreeable to assisting the Municipality by providing the requested "Equalization Division Assistance Services" under the terms and conditions of this Contract.

NOW, THEREFORE, in consideration of these premises and the mutual promises, representations, and agreements set forth in this Contract, and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, the County and the Municipality agree as follows:

§1. DEFINED TERMS. In addition to the above defined terms (i.e., "Contract", "County", "Municipality", and "Party" and "Parties"), the following words and expressions when printed with the first letter capitalized as shown herein, whether used in the singular or

plural, possessive or nonpossessive, and/or either within or without quotation marks, shall, be defined and interpreted as follows:

1.1. "County Agent" or "County Agents" means all Oakland County elected officials, appointed officials, directors, board members, council members, commissioners, authorities, other boards, committees, commissions, employees, managers, departments, divisions, volunteers, agents, representatives, and/or any such persons' successors or predecessors, agents, employees, attorneys, or auditors (whether such persons act or acted in their personal representative or official capacities), and/or any persons acting by, through, under, or in concert with any of them, excluding the Municipality and/or any Municipality Agents, as defined herein. "County Agent" and/or "County Agents" shall also include any person who was a County Agent anytime during the term of this Contract but, for any reason, is no longer employed, appointed, or elected and serving as a County Agent.

1.2. "Equalization Division Personnel" means a specific subset of and included as part of the larger group of County Agents as defined above and shall be further defined as all County Agents specifically employed and assigned by the County to work in the Equalization Division of the County's Department of Management and Budget as shown in the current County budget and/or personnel records of the County. For all purposes in this Contract, any reference to County Agents shall also include within that term all Equalization Division Personnel, but any reference in this Contract to Equalization Division Personnel shall not include any County Agent employed by the County in any other function, capacity, or organizational unit of the County other than the Equalization Division of the Department of Management and Budget.

1.3. "Municipality Agent" or "Municipality Agents" means all Municipality officers, elected officials, appointed officials, directors, board members, council members, authorities, boards, committees, commissions, employees, managers, departments, divisions, volunteers, agents, representatives, and/or any such persons' successors or predecessors, agents, employees, attorneys, or auditors (whether such persons act or acted in their personal, representative, or official capacities), and/or all persons acting by, through, under, or in concert with any of them, except that no County Agent shall be deemed a Municipality Agent and conversely, no Municipality Agent shall be deemed a County Agent. "Municipality Agent" shall also include any person who was a Municipality Agent at any time during this Contract but for any reason is no longer employed, appointed, or elected in that capacity.

1.4. "Claim(s)" mean all alleged losses, claims, complaints, demands for relief or damages, suits, causes of action, proceedings, judgments, deficiencies, liabilities, penalties, litigation costs and expenses, including, but not limited to, any reimbursement for reasonable attorney fees, witness fees, court costs, investigation and/or litigation expenses, any amounts paid in settlement, and/or any other amounts of any kind whatsoever which are imposed on, incurred by, or asserted against a Party, or for which a Party may become legally and/or contractually obligated to pay or defend against, whether direct, indirect or consequential, whether based upon any alleged violation of the constitution (Federal or State), any statute, rule, regulation or the common law, whether in law or equity, tort, contract, or otherwise, and/or whether commenced or threatened and arising out of the performance or participation in this Contract.

1.5. "Municipality Taxpayer" means all residents, property owners, persons, or taxable entities within the Municipality, or their representatives or agents, who may be liable or responsible for any property taxes assessed by the Municipality pursuant to any applicable State Property Tax Laws.

1.6. "State" shall be defined as the "State of Michigan," a sovereign governmental entity of the United States, and shall also include within its definition all departments or agencies of State government including specifically, but not limited to, the State Tax Commission, the State Tax Tribunal, and/or the State Department of Treasury.

§2. COUNTY EQUALIZATION DIVISION ASSISTANCE SERVICES. The full and complete scope of all County Equalization Division Assistance Services shall be as described and limited in the following subsections (hereinafter defined and referred to as either "Equalization Division Assistance Services" or "Services").

2.1. "EQUALIZATION DIVISION ASSISTANCE SERVICES" OR "SERVICES" TO BE PROVIDED. Equalization Division Assistance Services or Services, to be performed by County for the Municipality as those terms are defined in this Contract, shall only include and shall be limited to the following activities:

2.1.1. This Contract is to provide for annual assessment of real and personal property from July 1, 2022 to June 30, 2023 as required by laws of the State of Michigan. The County shall make assessments of real and personal property within the Municipality pursuant to MCL 211.10d.

2.1.2. The Equalization Division personnel will appraise all property, process all real and personal property description changes, prepare the assessment roll for real and personal property in the Municipality; attend March, July and December Boards of Review and other such duties as required by the State General Property Tax Laws. The Equalization Division personnel will also be available for consultation on all Michigan Tax Tribunal real and personal property and special assessment appeals and will assist the Municipality in the preparation of both the oral and written defense of appeals, as long as there is a current Contract in effect.

2.2. PURPOSE OF COUNTY "SERVICES". The purpose of all Equalization Division Assistance Services or Services to be performed under this Contract shall be to assist (e.g., to help, aid, lend support, and/or participate as an auxiliary, to contribute effort toward completion of a goal, etc.) the Municipality in the performance of that Municipality's official functions, obligations, and the Municipality's legal responsibilities for property tax appraisal and assessment pursuant to the applicable State Property Tax Laws.

2.3. MANNER COUNTY TO PROVIDE SERVICES. All Equalization Division Assistance Services or Services to be provided by the County for the Municipality under this Contract shall be performed solely and exclusively by the County's Equalization Division Personnel.

2.3.1. Equalization Division Personnel, including those certified as Michigan Master Assessing Officers (MMAO), shall be employed and assigned by the County in such numbers and based on such appropriate qualifications and other factors as decided solely by the County.

2.3.2. The County shall be solely and exclusively responsible for furnishing all Equalization Division Personnel with job instructions, job descriptions, and job specifications and shall in all circumstances control, supervise, train, or direct all Equalization Division Personnel in the performance of all Services under this Contract.

2.3.3. Except as otherwise expressly provided for herein, the County shall remain the sole and exclusive employer of all County Agents and Equalization Division Personnel and that the County shall remain solely and completely liable for all County Agents' past, present, or future wages, compensation, overtime wages, expenses, fringe benefits, pension or retirement benefits, travel expenses, mileage allowances, training expenses, transportation costs, and/or other allowances or reimbursements of any kind, including, but not limited to, workers' disability compensation benefits, unemployment compensation, Social Security Act protection(s) and benefits, any employment taxes, and/or any other statutory or contractual right or benefit based on or in any way related to any County Agent's employment status.

2.3.4. This Contract is neither intended, nor shall it be interpreted, to create, change, grant, modify, supplement, supersede, alter, or otherwise affect or control, in any manner, form, or at any time, any right, privilege, benefit, or any other term or condition of employment, of any kind or nature whatsoever, in, upon, or for any County Agent or Equalization Division Personnel with the County, any applicable County employment and/or union contract, and/or any County rule(s), regulation(s), hours of work, shift assignment, order(s), policy(ies), procedure(s), directive(s), ethical guideline(s), etc., which shall, solely and exclusively, govern and control the employment relationship between the County and any County Agent or Equalization Division Personnel and/or the conduct and actions of any County Agent or any Equalization Division Personnel. To illustrate, but not otherwise limit, this Contract does not and shall not be interpreted to limit, modify, control, or otherwise affect, in any manner:

2.3.4.1. The County's sole and exclusive right, obligation, responsibility, and discretion to employ, compensate, assign, reassign, transfer, promote, reclassify, discipline, demote, layoff, furlough, discharge any Equalization Division Personnel and/or pay all Equalization Division Personnel's wages, salaries, allowances, reimbursements, compensation, fringe benefits, or otherwise decide all such terms and conditions of employment and make all employment decisions that affect, in any way, the employment of any Equalization Division Personnel with the County, subject only to its applicable collective bargaining Contracts.

2.3.4.2. The County's sole and exclusive right, obligation, and responsibility to determine, establish, modify, or implement all operational policies, procedures, orders, rules, regulations, ethical guidelines, and/or any other judgment, policy or directive which, in any way, governs or controls any activity of any County Agent or Equalization Division Personnel, any necessary County Agent or Equalization Division Personnel's

training standards or proficiency(ies), any level or amount of required supervision, all standards of performance, any sequence or manner of performance, and any level(s) of experience, training, or education required for any Equalization Division Personnel performing any County duty or obligation under the terms of this Contract.

2.3.5. Except as expressly provided for under the terms of this Contract and/or laws of this State, no County Agent or Equalization Division Personnel, while such person is currently and/or actively employed or otherwise remains on the payroll of the County as a County Agent shall be employed, utilized, or perform any other services, of any kind, directly or indirectly, in any manner or capacity, or otherwise be available to perform any other work or assignments by or for the Municipality during the term of this Contract. This section shall not prohibit the Municipality from employing any person who was a former County Agent but is no longer employed in that capacity by the County.

2.3.6. Except as otherwise expressly provided by the Contract and/or applicable State law, neither the County, nor any County Agent, nor any Equalization Division Personnel, by virtue of this Contract or otherwise, shall be deemed, considered or claimed to be an employee of the Municipality and/or a Municipality Agent.

2.3.7. The Municipality shall not otherwise provide, furnish or assign any Equalization Division Personnel with any job instructions, job descriptions, job specifications, or job duties, or in any manner attempt to control, supervise, train, or direct any Personnel in the performance of any County's Equalization Division Assistance Services duty or obligation under the terms of this Contract.

2.4. LIMITS AND EXCLUSIONS ON COUNTY "SERVICES". Except as otherwise expressly provided for within this Contract, neither the County nor any County Agents shall be responsible for assisting or providing any other services or assistance to the Municipality or assume any additional responsibility for assisting the Municipality in any other way or manner with any Municipality obligations under all State Property Tax Laws, including, but not limited to, providing any attorney or legal representation to the Municipality or any Municipality Agent at any proceeding before the Michigan Tax Tribunal or any other adjudicative body or court, except as expressly provided for in this Contract.

2.4.1. The Municipality shall, at all times and under all circumstances, remain solely liable for all costs, legal obligations, and/or civil liabilities associated with or in any way related to any Municipality tax appraisal or assessment functions or any other Municipality legal obligation under any applicable State Property Tax Laws. The Municipality shall employ and retain its own Municipality legal representation, as necessary, to defend any such claim or challenge before the State Tax Tribunal or any other court or review body.

2.4.2. Except for those express statutory and/or regulatory obligations incumbent only upon licensed Equalization Division Personnel (i.e., State Licensed and Certified Real and/or Personal Property Tax Assessors) to

defend property tax appraisals and assessments that they either performed, or were otherwise performed under their supervision, before the Michigan Tax Tribunal, no other County Agents, including any County attorneys shall be authorized, required and/or otherwise obligated under this Contract or pursuant to any other agreement between the Parties to provide any legal representation to or for the Municipality and/or otherwise defend, challenge, contest, appeal, or argue on behalf of the Municipality before the Michigan Tax Tribunal or any other review body or court.

§3. TERM OF CONTRACT. The Parties the term of this Contract shall begin on July 1, 2022 and shall end on June 30, 2023, without any further act or notice from either Party being required. All Services otherwise provided to the Municipality prior to the effective date of this Contract, shall be subject to the terms and conditions provided for herein.

§4. NO TRANSFER OF MUNICIPALITY LEGAL OBLIGATIONS TO COUNTY. Except as expressly provided for in this Contract, the Municipality agrees that this Contract does not, and is not intended to, transfer, delegate, or assign to the County, and/or any County Agent or Equalization Division Personnel any civil or legal responsibility, duty, obligation, duty of care, cost, legal obligation, or liability associated with any governmental function delegated and/or entrusted to the Municipality under any applicable State Property Tax Laws.

4.1. The Municipality shall, at all times and under all circumstances, remain solely liable for all costs, legal obligations, and/or civil liabilities associated with or in any way related to any Municipality tax appraisal or assessment functions or any other Municipality legal obligation. Under no circumstances shall the County be responsible for any costs, obligations, and/or civil liabilities associated with its Municipality function or any responsibility under any State Property Tax Law.

4.2. The Municipality shall not incur or create any debts, liens, liabilities or obligations for the County and shall take all necessary steps to ensure that any debts, liens, liabilities, or obligations that the Municipality may incur shall not become a debt, liability, obligation, or Claim(s) against the County.

4.3. The Municipality shall at all times remain responsible for the ultimate completion of all Municipality duties or obligations under all applicable State Property Tax Laws. Nothing in this Contract shall relieve the Municipality of any Municipality duty or obligation under any applicable State Property Tax Law.

4.4. The Municipality and Municipality Agents shall be and remain responsible for compliance with all Federal, State, and local laws, ordinances, regulations, and agency requirements in any manner affecting any work or performance of this Contract or with any Municipality duty or obligation under any applicable State Property Tax Law.

§5. NO DELEGATION OR DIMINUTION OF ANY GOVERNMENTAL AUTHORITY. The Parties reserve to themselves any rights and obligations related to the provision of all of each Party's respective governmental services, authority, responsibilities, and obligations. Except as otherwise expressly provided herein, this Contract does not, and is not intended to, create, diminish, delegate, transfer, assign, divest, impair, or contravene any constitutional, statutory, and/or other legal right, privilege, power, civil or legal responsibility, obligation, duty of care, liability, capacity, immunity, authority or character of office of either Party.

5.1. Notwithstanding any other term or condition in this Contract, that no provision in this Contract is intended, nor shall it be construed, as a waiver of any governmental immunity, as provided by statute or applicable court decisions, by either Party, either for that Party and/or any of that Party's County or Municipal Agents.

5.2. Notwithstanding any other provision in this Contract, nothing in this Contract shall be deemed to, in any way, limit or prohibit the Oakland County Board of Commissioners statutory rights and obligations to review and/or further equalize Municipality property values or tax assessments and/or further act upon any Municipality assessment(s) of property taxes under any applicable State Property Tax Laws, including, but not limited to challenging any Municipality assessment before the Michigan Tax Tribunal.

§6. PAYMENT SCHEDULE. The Municipality shall pay to the County the following: For the contract year 2022-2023 the sum of $15.00 for each real property description and $13.72 for each personal property description rendered. Payment for the contract year 2022-2023 is payable on or before July 1, 2023.

If during the term of this Contract, there are additional services requested of the County, the Parties shall negotiate additional fees to be paid by the Municipality.

6.1. All time incurred for Board of Review dates beyond the regular County working hours to be billed at the applicable Equalization Division personnel's overtime rate and charged to the Municipality over and above any other fees described in this Contract, with the following exceptions:

6.1.1. One evening meeting as required by law under MCL § 211.30(3).

6.1.2. Dates requiring overtime set by the Municipality Charter.

6.2. The Municipality shall be responsible for postage on all personal property statements and personal property notices mailed relating to work performed under this Contract. The Municipality agrees to be responsible for all photographic supplies.

6.3. If the Municipality fails, for any reason, to pay the County any monies when and as due under this Contract, the Municipality agrees that unless expressly prohibited by law, the County or the County Treasurer, at their sole option, shall be entitled to a setoff from any other Municipality funds that are in the County's possession for any reason. Funds include but are not limited to the Delinquent Tax Revolving Fund ("DTRF"). Any setoff or retention of funds by the County shall be deemed a voluntary assignment of the amount by the Municipality to the County. The Municipality waives any claims against the County or its Officials for any acts related specifically to the County's offsetting or retaining such amounts. This paragraph shall not limit the Municipality's legal right to dispute whether the underlying amount retained by the County was actually due and owing under this Contract.

6.4. If the County chooses not to exercise its right to setoff or if any setoff is insufficient to fully pay the County any amounts due and owing the County under this Contract, the County shall have the right to charge up to the then-maximum legal interest on any unpaid amount. Interest charges shall be in addition to any other amounts due to the County under this Contract. Interest charges shall be

calculated using the daily unpaid balance method and accumulate until all outstanding amounts and accumulated interest are fully paid.

6.5. Nothing in this Section shall operate to limit the County's right to pursue or exercise any other legal rights or remedies under this Contract against the Municipality to secure reimbursement of amounts due the County under this Contract. The remedies in this Section shall be available to the County on an ongoing and successive basis if Municipality at any time becomes delinquent in its payment. Notwithstanding any other term and condition in this Contract, if the County pursues any legal action in any court to secure its payment under this Contract, the Municipality agrees to pay all costs and expenses, including attorney's fees and court costs, incurred by the County in the collection of any amount owed by the Municipality.

6.6. Notwithstanding any other term or condition in this Contract, should the Municipality fail for any reason to timely pay the County the amounts required under this Contract, the County may discontinue, upon thirty (30) days written notice to the Municipality, without any penalty or liability whatsoever, any Services or performance obligations under this Contract.

§7. LIABILITY. Each Party shall be responsible for any Claims made against that Party and for the acts of County Agents or Municipality Agents, as applicable. In any Claims that may arise from the performance of this Contract, each Party shall seek its own legal representation and bear the costs associated with such representation including any attorney fees.

7.1. This Contract does not and is not intended to create or include any County warranty, promise, covenant or guaranty, either express or implied, of any kind or nature whatsoever in favor of the Municipality, and/or any Municipality Agents, or any Municipality Taxpayer or any other person or entity, or that the County's efforts in the performance of any obligation under this Contract will result in any specific monetary benefit or efficiency, or increase in any tax revenue for the Municipality, or will result in any specific reduction or increase in any property assessment, or guarantee that any Services provided under this Contract will withstand any challenge before the State Tax Tribunal or any court or review body, or any other such performance-based outcome.

7.2. In the event of any alleged breach, wrongful termination, and/or any default of any term or condition of this Contract by either the County or any County Agent, the County and/or any County Agent shall not be liable to the Municipality for any indirect, incidental, special, or consequential damages, including, but not limited to any replacement costs for Services, any loss of income or revenue, and/or any failure by the Municipality to meet any Municipality obligation under any applicable State Property Tax Laws, or any other economic benefit or harm that the Municipality may have realized, but for any alleged breach, wrongful termination, default and/or cancellation of this Contract, or damages beyond or in excess of the amount(s) of any amount paid to, received or retained by the County at the time of the alleged breach or default in connection with or under the terms of this Contract, whether such alleged breach or default is alleged in an action in contract or tort and/or whether or not the Municipality has been advised of the possibility of such damages. This provision and this Contract is intended by the Parties to allocate the risks between the Parties, and the Parties agree that the allocation of each Party's efforts, costs, and obligations under this

Contract reflect this allocation of each Party's risk and the limitations of liability as specified herein.

7.3. Neither Party has any right pursuant to or under this Contract against the other Party to or for any indemnification (i.e., contractually, legally, equitably, or by implication) contribution, subrogation, or other right to be reimbursed by the Party based upon any legal theories or alleged rights of any kind, whether known or unknown, for any alleged losses, claims, complaints, demands for relief or damages, judgments, deficiencies, liability, penalties, litigation costs and expenses of any kind whatsoever which are imposed on, incurred by, or asserted against a Party and which are alleged to have arisen under or are in any way based or predicated upon this Contract.

7.4. If the Municipality requests and the County agrees, the County may prepare the actual tax statement for mailing by the Municipality to Municipality residents. In preparing any such tax statement the County shall rely upon certain data provided by the Municipality beyond the data gathered by the County under this Contract, including, but not limited to, the applicable millage rate. Under no circumstances shall the County be held liable to the Municipality or any third party based upon any error in any tax statement due to information supplied by the Municipality to the County for such purposes.

§8. MUNICIPALITY AGENTS AND COOPERATION WITH THE COUNTY. The Municipality shall be solely responsible for guaranteeing that all Municipality Agents fully cooperate with Equalization Division Personnel in the performance of all Services under this Contract. The County shall be solely responsible for guaranteeing that all Equalization Division personnel fully cooperate with Municipality agents in the performance of all Services under this Contract.

8.1. Municipality Agents shall be employed and assigned based on appropriate qualifications and other factors as decided by the Municipality. The Municipality shall be solely responsible for furnishing all Municipality Agents with all job instructions, job descriptions and job specifications and shall solely control, direct, and supervise all Municipality Agents and shall be solely responsible for the means and manner in which Municipality's duties or obligations under any applicable State Property Tax Laws are satisfied.

8.2. The Municipality shall be solely liable for all Municipality Agents' past, present, or future wages, compensation, overtime wages, expenses, fringe benefits, pension or retirement benefits, travel expenses, mileage allowances, training expenses, transportation costs, and/or other allowances or reimbursements of any kind, including, but not limited to, workers' disability compensation benefits, unemployment compensation, Social Security Act protection(s) and benefits, any employment taxes, and/or any other statutory or contractual right or benefit based on or in any way related to any Municipality Agent's employment status or any alleged violation of any Municipality Agent's statutory, contractual (e.g., union, employment, or labor contract), constitutional, common law employment right, and/or civil rights by the Municipality. The Municipality agrees to indemnify and hold harmless the County from and against all Claim(s) which are imposed upon, incurred by, or asserted against the County or any County Agent by any Municipality Agent and/or which are based upon, result from, or arise from, or are in any way related to any Municipality Agent's wages, compensation, benefits, or

other employment-related or based rights, including, but not limited to, those described in this section.

8.3. No Municipality Agent shall, by virtue of this Contract or otherwise, be considered or claimed to be an employee of the County and/or a County Agent. This Contract does not grant or confer, and shall not be interpreted to grant or confer, upon any Municipality Agents or any other individual any status, privilege, right, or benefit of County employment or that of a County Agent.

8.4. The Municipality shall provide the County with information regarding any activity affecting the tax status of any parcel including but not limited to the following: Downtown Development Authorities, Redevelopment Plans, Tax Increment Financing Authorities. In addition, the Municipality shall notify the County immediately of approval of any application for abatement or tax exemption.

8.5. The Municipality shall inform the County Agents regarding any increase in taxation which is governed by the Truth in Taxation Act. Further, the Municipality shall inform the County Agents regarding any millage increase (new) or renewal.

8.6. The Municipality is responsible for Special Assessment billings, maintaining a paper trail of roll changes, maintaining the rolls in balance, and providing the Oakland County Equalization Division with the information necessary to prepare the warrant.

8.7. The Municipality Agents shall perform the following functions:

8.7.1. Mechanically make name changes to Sidwell numbers on a monthly basis using the County's Computer terminals.

8.7.2. Provide a copy of all building permits with Sidwell numbers to the County's Equalization Division on a monthly basis.

8.7.3. Be responsible for the establishment, accuracy, and compilation of all Special Assessment rolls in the Municipality.

8.7.4. Forward all exemption applications, transfer affidavits, personal property statements and all other documents affecting the status or value of property located within the Municipality to the County's Equalization Division in a timely manner.

8.7.5. Forward all information on splits and combinations after approval by the Municipality to the County's Equalization Division.

8.8. In the event that Municipality Agents, for whatever reason, fail or neglect to undertake the tasks in Section 8.7 above, the County's Equalization Division may perform these tasks and it shall be paid on a time and material basis. Such rate shall be based upon the wages plus benefits of the County Agents performing said tasks.

§9. INDEPENDENT CONTRACTOR. The County's and/or County Agents' legal status and relationship to the Municipality shall be that of an Independent Contractor. No liability, right, or benefits arising out of an employer/employee relationship, either express or implied, shall arise or accrue to either Party as a result of this Contract.

§10. COUNTY PRIORITIZATION OF COUNTY RESOURCES. This Contract does not, and is not intended to, create either any absolute right in favor of the Municipality or any correspondent absolute duty or obligation upon the County, to guarantee that any specific

number(s) or classification of County Agents will be present on any given day to provide Services to the Municipality.

§11. CANCELLATION OR TERMINATION OF THIS CONTRACT. Except as follows, and notwithstanding any other term or provision in any other section of this Contract, either Party, upon a minimum of ninety (90) calendar days written notice to the other Party, may cancel and/or completely terminate this Contract for any reason, including convenience, without incurring any penalty, expense, or liability to the other Party. The effective date for any such termination is to be clearly stated in the notice.

11.1. At 5:00 p.m. on the effective date of the cancellation of this Contract all Municipality and/or County obligations under this Contract, except those rights and obligations expressly surviving cancellation as provided for in this Contract, shall end.

11.2. All Municipality obligations, including, but not limited to, waivers of liability, record-keeping requirements, any Municipality payment obligations to the County, and/or any other related obligations provided for in this Contract with regard to any acts, occurrences, events, transactions, or Claim(s) either occurring or having their basis in any events or transactions that occurred before the cancellation or completion of this Contract, shall survive the cancellation or completion of this Contract.

§12. EFFECTIVE DATE, CONTRACT APPROVAL, AND AMENDMENT. This Contract, and/or any amendments thereto, shall be approved by resolutions of both the Oakland County Board of Commissioners and the Governing Body of the Municipality. The approval and terms of this Contract, and/or any amendments thereto, shall be entered in the official minutes and proceedings of both the Oakland County Board of Commissioners and the Governing Body of the Municipality and shall also be filed with the office of the County Clerk, the Clerk for the Municipality, and the Secretary of State.

§13. NO THIRD-PARTY BENEFICIARIES. Except as expressly provided herein for the benefit of the Parties, this Contract does not, and is not intended to, create, by implication or otherwise, any direct or indirect obligation, duty, promise, benefit, right to be indemnified (i.e., contractually, legally, equitably, or by implication) and/or any right to be subrogated to any Party's rights in this Contract, and/or any other right of any kind, in favor of any person, including, but not limited to, any County Agent or Municipality Agent or any Municipality Taxpayer, any Taxpayer's legal representative, any organization, any alleged unnamed beneficiary or assignee, and/or any other person.

§14. CONSTRUED AS A WHOLE. The language of all parts of this Contract is intended to and, in all cases, shall be construed as a whole according to its fair meaning, and not construed strictly for or against any Party. As used in this Contract, the singular or plural number, possessive or nonpossessive shall be deemed to include the other whenever the context so suggests or requires.

§15. CAPTIONS. The section headings or titles and/or all section numbers contained in this Contract are intended for the convenience of the reader and not intended to have any substantive meaning and are not to be interpreted as part of this Contract.

§16. NOTICES. Except as otherwise expressly provided for herein, all correspondence, invoices, and/or any other written notices required, permitted or provided for under this Contract to be delivered to either Party shall be sent to that Party by first class mail. All such written notices, including any notice canceling or terminating this Contract as provided for herein, shall be sent to the other Party's signatory to this Contract, or that

signatory's successor in office, at the addresses shown in this Contract. All correspondence or written notices shall be considered delivered to a Party as of the date that such notice is deposited with sufficient postage with the U.S. Postal Service.

§17. WAIVER OF BREACH. The waiver of a breach of any provision of this Contract shall not operate or be construed as a waiver of any subsequent breach. Each and every right, remedy and power granted to either Party or allowed it by law shall be cumulative and not exclusive of any other.

§18. ENTIRE CONTRACT. This Contract sets forth the entire agreement between the County and the Municipality and supersedes all prior agreements or understandings between them in any way related to the subject matter hereof. All terms and conditions herein are contractual and are not a mere recital and that there are no other agreements, understandings, contracts, or representations between the County and the Municipality in any way related to the subject matter hereof, except as expressly stated herein. This Contract shall not be changed or supplemented orally and may be amended only as otherwise provided herein.

The undersigned execute this Contract on behalf of the Parties and by doing so legally obligate and bind the Parties to this Contract.

IN WITNESS WHEREOF, Bret Scott, Mayor of the City of Pleasant Ridge, acknowledges that he has been authorized by a resolution of the Governing Body of the City of Pleasant Ridge to execute this Contract and accepts and binds the City of Pleasant Ridge to this Contract.

EXECUTED: _____ DATE: _____
Bret Scott, Mayor
City of Pleasant Ridge

WITNESSED: _____ DATE: _____
Amy Allison, Clerk
City of Pleasant Ridge

IN WITNESS WHEREOF, David T. Woodward, Chairperson, Oakland County Board of Commissioners, acknowledges that he has been authorized by a resolution of the Oakland County Board of Commissioners to execute this Contract and accepts and binds Oakland County to this Contract.

EXECUTED: _____ DATE: _____
David T. Woodward, Chairperson
Oakland County Board of Commissioners

WITNESSED: _____ DATE: _____

(Print Name) _____ DATE: _____
County of Oakland